APRIL 24th

BEST OF ITS AWARDS

NASHVILLE

America's
finest

Rewarding innovation in ITS deployment and development, the Best of ITS Awards have firmly established themselves as the premier accolades of the traffic world. **Louise Smyth** meets the stars of this year's show

Illustration courtesy of Iveta Angelova

This isn't the first time we've covered ITS America's Best of ITS Awards, but if the recipients of these prizes were not continually innovative and inspiring, we would have ditched our coverage long ago. The fact remains that ITSA's annual gongs have emphatically continued to do justice to their name; the following pages really do showcase the best of ITS. And here we're talking about best practices, best-in-breed technology, best leadership and, quite simply, achieving the best results.

At the cutting edge
When presenting the awards at ITSA's Annual Meeting in Nashville, Tennessee in April, the organization's president, Scott Belcher, commented: "Each of the winners has demonstrated that they are not only at the cutting edge of transportation innovation, but that they are leading the industry forward". And that is ultimately why such acknowledgments have value in the real world – the fanfare around them gets people to think about whether lessons learned from the winners can be applied in their own jurisdictions.

Belcher also hinted that the competition was much stiffer this year. "With more applicants than ever, each of the winners exemplifies how technology can be used to create a safer, more

efficient and sustainable transportation system," he said at the ceremony.

What is interesting is that despite the broader range of entries, the winners were noteworthy in terms of geography. Of the six awards, two were won by Virginia DOT and two by Florida DOT – although different teams were responsible for each project. Of course you can't read too much into this, especially without seeing the entire list of award entries, but it's worth pondering exactly what Virginia and Florida are doing that other states may not be.

The awards, and therefore our coverage, were broken down into two categories – Best Innovative Product, Service or Application and Best Innovative Practice – with three winners in each of the two categories. And over the coming pages you will hear from the winners themselves about why they were deemed to be the stars of this year's show. >

Maximizing network efficiency

Applying predictive algorithms and real-time modeling tools to forecast traffic

The San Diego ICM project went live in March 2013 and sees an innovative system deployed that is designed to manage and optimize all available infrastructure, routes and modes in a proactive and coordinated manner. As part of the USDOT's larger initiative for reducing congestion in metropolitan areas, the San Diego Association of Governments (SANDAG) is leading the San Diego demonstrator project, with Delcan Corporation as systems integrator.

Focusing on a 20-mile stretch of I-15 between San Diego and Escondido, the project combines smart traffic management technologies and introduces concepts never before used together in the USA. The project's Decision Support System (DSS) uses strategies such as network traffic prediction, online microsimulation analysis and real-time response strategy assessment to give system managers comprehensive awareness of the current and predicted future performance of the entire corridor.

Rather than reacting to traffic conditions, managers can now anticipate problems before they arise and take preventative action using ICM strategies such as responsive traffic light synchronization, coordinated ramp metering and bus priority on arterials.

Core to ICM is the ability to forecast and simulate congestion and capacity imbalances in real time or near-real time. The multimodal DSS integrates two tools – the Delcan Intelligent

NETworks ATMS, for field device monitoring and control, center-to-center data fusion, event management and response plan generation; and Aimsun Online, a tool from TSS-Transport Simulation Systems. Aimsun Online uses live data feeds and simulations to dynamically forecast traffic conditions based on the current state of the network, which helps system managers evaluate incident response and congestion-management strategies.

Alex Estrella, senior transportation planner and ICM functional project manager at SANDAG (pictured), sees the Best Innovative Practice award as an acknowledgment that real-time simulation has the potential to completely transform traffic management.

"The San Diego ICM system is unique for incorporating the network prediction subsystem (NPS) and real-time simulation subsystem (RTSS)," he says. "The project transforms transportation management because it is based on a multi-agency and multimodal platform that leverages the application of innovative network prediction and real-time simulation technology, which ultimately helps our transportation partners implement coordinated response plans for managing congestion.

> **The project transforms transportation management because it is based on a multi-agency and multimodal platform**

"System managers can now make traffic management decisions based on current and predicted traffic conditions, something that's been missing from ATMS solutions. The ICM will not only change how we can manage congestion but is also a groundbreaking approach for getting the best out of our existing transportation systems to maintain and maximize capacity and efficiency."

Delcan's Dan Lukasik has some advice for others looking to establish a similar scheme: "Establish a strong regional partnership with all agencies and work to gain an understanding of how to operate, both before and during the project."

Lastly, Peter Thompson, senior regional ITS architect at SANDAG, comments, "The truly innovative aspect of this project is not that we did something cool with software – although the Delcan/TSS teams did – but more that the ICM partners provided this region with an approach that finally gives us the opportunity to answer in the affirmative the question, 'Can we be more proactive and less reactive?'"

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Ensuring a smooth, predictable trip

Virginia DOT's 495 Express Lanes recognized for use of innovative technology

The first of two wins for Virginia DOT was for a PPP involving the DOT itself along with the FHWA, Transurban as the scheme's operator, and Fluor. Michael Whelan, Transurban's VP of Operations (pictured), picked up an award for the Best Innovative Product, Service or Application. "In Northern Virginia, driving is often synonymous with congestion," he states. "In 2012 Northern Virginians had a solution to constantly gridlocked traffic with the 495 Express Lanes: 14 miles of four new high-occupancy toll (HOT) lanes on I-495. The scheme introduced new traffic patterns, new entrances and exits, a new E-ZPass and new rules of the road. The lanes opened early and on-budget in November 2012."

The scheme features a dynamic tolling pricing system – the first time such a complex dynamic tolling pricing and traffic management system has been implemented. AET is almost a given here, and variable toll prices based on real-time traffic conditions manage traffic in

> **The scheme introduced new traffic patterns, new entries and exits, a new E-ZPass and new rules of the road**

technology, infrastructure and personnel necessary for 24-hour operation".

Tony Adams, Transurban's vice president of Infrastructure, proudly adds: "Northern Virginians now have the option for a faster, more reliable trip on

the Express Lanes – providing a regional, free-flowing network. "Car poolers and transit can use the lanes for free with an E-ZPass Flex transponder," Whelan continues. "Other drivers can access the lanes by paying a toll via E-ZPass."

The scheme also has dedicated incident response and a high-tech operations center that Whelan says "combines the the Capital Beltway. The Express Lanes provide much needed traffic congestion relief to drivers around Washington, DC – where traffic is often rated among the worst in the country."

The nearly US$2bn project also replaced US$260m worth of aging infrastructure by rebuilding 58 interchange bridges and overpasses. Dedicated Express Lanes ramps, meanwhile, were constructed to provide convenient access to major employment and retail destinations.

Response to increased workload demands

Streamlining functions and automating manually intensive tasks for FDOT teams

The Operations Task Manager (OTM) software was created to improve the quality of services provided by the ITS Program to the motoring public in southeast Florida. "It enhances the program's output by increasing its internal efficiency in response to our area's growing demands," says FDOT District 6's Rory Santana, who collected a prize for Best Innovative Product, Service or Application.

"The combination of adding new high-profile projects along with new ITS devices increased the daily responsibilities and tasks for our TMC operators, supervisors and support staff," explains Alicia Torrez, FDOT's public information officer. "The team became directly in charge of operating the state's first dynamic pricing facility, posting messages onto the 511 Traveler Information System (TIS) and

managing additional roadway events. Faced with the need to produce more with the same resources, the FDOT District 6 Office developed OTM to manage the workload increase and improve internal efficiencies and service quality."

OTM features 10 software modules that, under one interface, support daily

> **This reduction produced time savings for our drivers of equivalent to US$1.7bn**

and updates onto the 511 TIS while responding to 22% more events and performing 60% more event management actions compared with FY 2010.

"It also allowed operators to detect 561% more incidents, increased ITS device maintenance support by 215% and enabled

traffic management, incident management, traveler information, device maintenance and reporting tasks. The modules automate these program functions to streamline operations. "This improvement optimized our staff's time, which led them to increase their performance and program output," confirms Torrez. "As a result of OTM, in FY 2011, operators published 340% more traveler information messages

staff to sustain the successful operations of the managed lanes project despite increased traffic."

Operations staff were able to reduce the average lane blockage to 27.5 minutes in FY 2011/2012, which is a 45% reduction from the 2005 baseline of 50 minutes. Torrez adds, "This reduction produced time savings for drivers of equivalent to US$1.7bn. As a result, the program's benefit-to-cost ratio is US$36 to 1."

The OTM software was completed in 2012 but there may still be additions as its has been designed to be modified according to operational need.

Statewide ITS infrastructure management

Supporting the needs of ITS managers, engineers, IT professionals, and maintenance technicians

Florida DOT was honored that its ITS Facility Management (ITSFM) project scooped an award in the Best Innovative Product, Service or Application category. Elizabeth Birriel, deputy state traffic operations engineer in the ITS Program (pictured), who picked up the trophy, offers some more detail about the system: "In coordination with its Districts and regional partners, and collaborating with private industry, FDOT State Traffic Engineering and Operations Office (FDOT Central Office), designed the ITSFM system to enable long-term ITS asset and configuration management for all transportation agencies statewide," she explains.

"This system compiles ITS asset information in a single,

web-accessible repository, allowing Districts and the Central Office to collectively manage the entire system in a coordinated manner," she continues. "FDOT has dramatically revised its maintenance operations to take advantage of this new tool to gain efficiencies, resulting in major savings and increased system availability and reliability."

The ITSFM system was much needed due to a historical lack of statewide standards for ITS planning and operations coupled with a distinct lack of data. It was built on the robust types

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of management systems found in the telecommunications industry and designed to manage the overall ITS network. "The ITSFM system is GIS-based and accessible from any internet-capable device, providing ease of access and portability to increase the efficiency of staff

– and increase overall use of the system for maximum program effectiveness with a level of control previously not thought possible," Birriel adds.

The pilot deployments of the ITSFM system have proved that FDOT can successfully solve the challenge of managing its ITS infrastructure assets so that it has a complete understanding of its system 'top to bottom' across agency owners. It has been fully implemented in District 6 and FDOT is aiming to deploy it statewide.

Supporting ITS through PPPs

A PPP arrangement that is greatly accelerating the Commonwealth's ITS program

According to Dean Gustafson, state operations engineer (pictured), Virginia DOT's prize in the Best Innovative Practice category is a "top honor" for VDOT's ITS practices.

"By partnering with broadband providers to construct a network where the infrastructure is predominately owned and maintained by the providers, VDOT has accelerated the transitioning of 111 traffic cameras, three DMS and 17 traffic signal systems onto the network," says ITS communications manager Melissa Lance. "We've reduced our monthly recurring costs while increasing network bandwidth, security, availability and reliability. Maintenance costs for communications infrastructure is reduced, too, as most of the fiber infrastructure is owned and maintained by the resource-sharing partners."
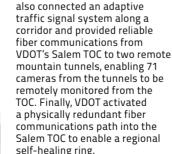
The partnerships were developed through VDOT's Fiber Optic Resource Sharing Program, through which telecommunications providers are allowed to to place fiber-optic infrastructure along VDOT's limited-access right-of-way. In exchange, the providers allow VDOT to make operational use

> ❝ The program has been the foundation to the development of VDOT's ITS network backbone

of several strands of dark fiber within the network. The program has been the foundation to the development of VDOT's ITS network backbone. Without these partnerships and the development of their networks, VDOT wouldn't be able to afford to design and construct the current 650-mile fiber-optic network.

Through agreements with four partners, VDOT deployed a network between its Salem and Richmond TOCs in 2009/2010. While much of the deployment occurred prior to 2011, VDOT didn't actually begin connecting most of the devices and taking advantage until 2011-2012. Lance explains that during that time VDOT was busy connecting the previously mentioned cameras, DMS and traffic signals to its

ITS backbone network. VDOT also connected an adaptive traffic signal system along a corridor and provided reliable fiber communications from VDOT's Salem TOC to two remote mountain tunnels, enabling 71 cameras from the tunnels to be remotely monitored from the TOC. Finally, VDOT activated a physically redundant fiber communications path into the Salem TOC to enable a regional self-healing ring.

"Ultimately, it's addressed a lack of reliable communications; high telecommunications installation costs; and operating and maintenance responsibilities," concludes Lance.

Wireless communications deployment

LA County is using wireless traffic control signals to cut congestion, costs and exhaust emissions

Jane White, LA County Public Works' ITS program manager, is extremely proud of the agency's innovative, wireless communication system deployment. "We believe it is a unique deployment, which has saved Los Angeles County millions of dollars over more traditional communication methods," she says. "We are delighted that ITS America recognized it with this Best Innovative Practice award."

This wireless system is a crucial part of LA County's regional traffic management system and involves the deployment of traffic signal control systems (TCS), primarily using a wireless Ethernet broadband radio communications system (WCS). This WCS includes radios that work in conjunction with twisted-pair cables and fiber. In addition, CCTV cameras are installed at key locations to enable direct viewing of the operation of the intersection in real time. The communication goes from the traffic signal back to the LA County Public Works' HQ in Alhambra. "With LA County as both leader and facilitator, this project seeks to get as many signalized intersections throughout the county as possible connected and

communicating to a TCS," says Marty Amundson (right), senior civil engineer and head of Signal Systems section – Traffic and Lighting Division.

LA County Public Works maintains around 1,600 traffic signals, 840 of which are partially or completely within the unincorporated area of the county and 760 in some of the county's 88 cities. When it first took on this role, Public Works found that the communications infrastructure

was largely non-existent or included twisted-pair cables interconnecting traffic signal controllers within individual cities. Much of the existing cabling was old. "To establish communication, the primary challenge was to transmit traffic signal and CCTV data over our wide geographic area and relay that information to Public Works' TMC in Alhambra," White says. "It needed to be deployed quickly and reliably. It also needed to be cost-effective, manageable, expandable, flexible and supportable by county maintenance staff.

"The ultimate challenge is to connect and combine both larger and smaller cities' signals into one network that can be efficiently monitored or managed by Public Works and city staff to serve all residents of the county."

The Alhambra TMC is currently connected to more than 1,000 intersections, 50 CCTV sites and eight other city TMCs. So far the wireless system has generated savings of at least US$500,000.

"This project has been successful due to the efforts between the contractor and Los Angeles County," says Larry Pomatto, the project manager from communications system contractor, Systems Integrated. "Each organization was able to use its best resources. The County field crews took on the responsibility to install the radios, which enabled them to develop expertise and they are now able to maintain the devices. It's been a win-win from the start."

"This program has enabled the development and deployment of ITS for smaller agencies that didn't have the means or resources to effectively operate their traffic signals," White maintains. "Before these initial efforts by the County, traffic signals were uncoordinated and there was very limited communication to traffic signals. In addition there was no traffic signal coordination across jurisdictional boundaries." ◯

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