

pulse

m a g a z i n e



20 YEARS AND COUNTING...

ITS has been an active part of global transportation for two decades now – what have we accomplished? p. 10

ITS

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SPAIN

HD Performs Well in Evaluations
SmartSensor HD recently went through a series of tests in Spain and proved its high level of performance accuracy when measuring vehicle volumes. The study was conducted on behalf of Abertis, one of Spain's leading toll-road management firms, and showed that HD has a 98.9 percent volume accuracy rating. Abertis manages approximately 4,171 miles (6,713 kilometers) of motorway throughout Europe, and was particularly interested in evaluating HD's volume data. The study was performed by Pierre Menuet, a Wavetronix

application engineer, and Quadrex, the authorized Wavetronix channel partner in Spain. Test sites included three six-lane highways and one eight-lane highway. SmartSensor HD was used to measure vehicle volumes for 10 minutes at each site, and then HD's data was compared against video taken during the same time period. In addition to its exceptionally high rate of accuracy, the analysis report for the study also showed that HD provided other benefits. First, HD is a non-intrusive device, so it's safer and more convenient to install than inductive loops and other intrusive devices. Second, a single HD sensor can measure up to 22 lanes

of traffic in both directions, saving both money and manpower at installation. Third, SmartSensor HD's patented high definition radar is not impacted by low visibility conditions or extreme temperatures, and it can handle adverse weather conditions better than other technologies, without requiring routine maintenance or adjustments over time. "These tests prove that SmartSensor HD is the most accurate and reliable tool for measuring traffic volume," Menuet says. "Its high level of accuracy, combined with the benefits that Wavetronix radar has over other technologies, highlights why Wavetronix is the gold standard for the traffic detection industry." ■

CHINA

**Partnership Between Wavetronix and Beijing Expands**

The city of Beijing, China has seen an astronomical rise in the number of vehicles on its roads over the past two decades, creating one of the most problematic traffic situations in the world. In order to combat this growing concern, Beijing has initiated a number of programs and technologies intended to help ease congestion, including the usage of Wavetronix SmartSensor radar vehicle sensors.

This partnership between Wavetronix and Beijing continues to grow as more and more SmartSensor units are being installed along the streets and highways of the third most populous city in the world. According to the Statistical Yearbook of Beijing (1994-2012), in 1993 there were less than 50 vehicles per 10,000 people in Beijing. That number has exploded to more than 450 today, making Beijing one of the largest automobile markets in the world and the most congested city in China.

Beijing learned about the important role Wavetronix radar plays in modern, high-tech traffic systems during the 2008 Olympic Games, when SmartSensor HD was chosen for use in the Expressway Traffic Flow Detection System project.

Today, Beijing continues to utilize SmartSensor HD along freeways and arterials, and traffic engineers there have even added SmartSensor Matrix at intersections. Nearly a thousand SmartSensor units are being utilized in Beijing alone, including around 150 sensors purchased over summer 2014 for use along freeways.

According to Min-Der Day, the director of Asia ITS at Wavetronix, the strength of the relationship between Beijing and Wavetronix is based, in part, on the company's reputation in China for high performance and reliability. In addition, Day says that Wavetronix's Beijing office allows the company to provide extensive after-sale support and service as well as professional technical training.

"The quality of Wavetronix products, along with excellent customer support and training, has made Wavetronix an important partner in solving Beijing's unique traffic problems," Day says. ■

UNITED STATES

**US Congress Extends Highway Funding**

In summer 2014, US lawmakers passed a \$10.8 billion highway funding bill, less than a month before the Highway Trust Fund, which funds around \$35 billion in transportation projects, would have become bankrupt. The last-minute deal only funds the trust fund for 10 months, leaving the tough question of how to fix the problem later.

Approximately \$9 billion of the stop-gap measure is funded by a pension-smoothing tactic, which allows companies to reduce pension contributions and results in increased government revenue because companies lose out on pension tax deductions. An additional \$1 billion was transferred from a fund used to pay for clean-up costs of leaky underground fuel storage tanks and an extension of fees paid for processing passengers and vehicles through customs offices.

While the temporary extension was passed by a large bipartisan group, voices on all sides of the political spectrum were critical both of the way the funding was acquired for the bill and for the fact that it is a stop-gap measure that only postpones tough decisions about how to pay for US transportation in the future.

"Congress can do better and America needs better," said Rep. Peter Welch (D., Vt.), calling the pension-smoothing scheme "creating a pothole in the pension system in order to fix a pothole on the highway."

The Highway Trust Fund is bankrolled mainly through the 18.4 cent-per-gallon gas tax, an amount that has not increased since 1993. Meanwhile, Americans are driving fewer miles and using vehicles that are more fuel efficient, leading to a deficit which the US Department of Transportation believes will reach around \$170 billion over the next decade if business continues as normal.

Apart from increasing the gas tax, ideas on how to improve the situation are in short supply and mired in politics. An 11-state consortium in the western United States is experimenting with a mileage-based road tax where motorists would pay based on actual road usage. In other areas, public/private partnerships are being utilized, resulting in toll roads that fund private groups who then maintain the infrastructure. Still others say increased spending on public transportation will decrease the strain on the infrastructure, saving money in the long run. Each probable solution is steeped with politics that make decisions and compromise difficult.

Regardless of the potential solution, US lawmakers will once again have to face the problem of a disappearing Highway Trust Fund in the summer of 2015. ■

PENNSYLVANIA, USA

Rural Intersections Benefiting from Matrix

The Wavetronix SmartSensor Matrix is being installed at a new intersection in rural Pennsylvania in order to improve traffic efficiency, and officials hope to use the installation as a model for future deployments at other rural intersections.

The intersection in Franconia, Pennsylvania, brings together three important roads—Cowpath Road, Godshall Road and West Broad Street—into a new intersection configuration and adds a new traffic signal. Traffic engineers opted to install radar instead of cameras, which are widely used throughout Pennsylvania, because, unlike cameras, Matrix performs well in difficult conditions, including changes in weather or light. Matrix also features a 140-foot, 90-degree field of view, so it monitors a wider area than cameras.

"The radar will be able to operate without those issues," Cindy VanHise, traffic engineer for the city of Franconia, told the Montgomery News. "They can really get a good picture of what's going on out there."

The Montgomery News reported that the system can and will be operated as a stand-alone system for the traffic signal at this particular intersection. The Matrix system is new to Franconia, although approximately 70 signalized intersections use the detector throughout the five-county area of southeastern Pennsylvania that encompasses Franconia.

"These are used in more rural areas where there are large spaces between traffic signals," said Charles Metzger, the community relations coordinator for the Pennsylvania Department of Transportation.

According to the Montgomery News, federal funding is covering 80 percent of the intersection realignment and improvement project. The intersection has been closed to traffic since June and is scheduled to reopen in November. ■

WASHINGTON, USA

SmartSensor Intersections Honored for 'Target Zero'

An impressive signal optimization project in Clark County, Washington, has been recognized by state leaders as an outstanding example of the efforts being made throughout Washington State to reduce traffic fatalities and improve driving conditions.

Clark County Public Works received a 2014 Target Zero award in the category of intersections, for its program to update traffic signal systems. According to Rob Klug, the traffic operations and engineering lead for Clark County Public Works, many traffic signal systems in the county date back to 1982, and the out-of-date equipment has contributed to accidents.

Part of the upgrade includes replacing loops with SmartSensor Advance and SmartSensor Matrix. SmartSensor allows the county to update its traffic systems without incurring the costs of burying loops in the road. It also alleviates the dangers posed to workers and the traffic disruptions caused by the lane closures required to install loops.

"We went from a system that had no information at all to a full ITS architecture design, where we have a central system that talks to each signal once per second," Klug says. "We have about 85 percent of all of our signals on the system now."

Klug says the information provided by the SmartSensors gives them a richer set of data to work with. "We can do a better job of moving cars because we have a better idea of what traffic is doing," he says.

The state of Washington launched the Target Zero Strategic Highway Safety Plan in 2000, with the goal to achieve zero traffic fatalities and zero serious injuries by the year 2030. Since 2005, the state has reported a steady decline in fatalities, and officials believe continued progress in programs like Clark County's will help Washington lead the nation in "targeting zero."

This year's awards ceremony was held 16 April 2014 to honor those who have made significant contributions to the Target Zero program. ■

UTAH, USA

**Utah DOT Hosts Annual Conference**

The Utah Department of Transportation held its annual conference 28-30 October 2014, and Wavetronix was an active participant. In addition to exhibiting at the conference, Wavetronix products featured prominently in many of the projects that UDOT highlighted as examples of this year's conference theme: "Collaboration is the Road to Success."

The three-day conference, which included exhibits, keynote addresses and classes, was attended by thousands of traffic professionals, contractors and suppliers, many of whom have contributed to UDOT's mission.

"With three million residents now and 2.5 million more expected in 30 years, our vision at UDOT is simple—keep Utah moving," Carlos Braceras, P.E. and executive director at UDOT, told attendees. "UDOT's mission is to create innovative transportation solutions that strengthen Utah's economy and enhance quality of life."

To accomplish this, UDOT's strategic goals have focused on safety, including zero injuries or fatalities; mobility and innovation; and preserving infrastructure. Safety has become such a priority at UDOT, Braceras announced at the conference that employees, contractors and suppliers will be invited to participate in an extensive safety education program that the agency plans to implement through the next two years.

Conference workshops mirrored UDOT's commitment to innovation and drew attention to several projects that illustrate the agency's interest in collaboration. For example, UDOT's Signal Performance Metrics website, which relies heavily on data provided by SmartSensor Advance and SmartSensor Matrix, was featured in a workshop on signal innovation. The website is part of a national innovation initiative and shows the increasing effectiveness of signalized intersections due to improved detection. The website is open to the public and can be viewed at <http://udottraffic.utah.gov/signalperformancemetrics>. ■

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20 YEARS AND COUNTING...

BY PETE GOLDIN

ITS has been an active part of global transportation for two decades now – what have we accomplished? Looking back shows us not just how far we've come, but also how much we can still do.

DETROIT HOSTED THE 21ST WORLD CONGRESS on Intelligent Transport Systems this year, and although much of the program was forward-looking, it was also a time for the industry to look back and consider what has been accomplished in the 20 years since that first event.

"One of the things people don't often appreciate is that the last 20 years in ITS have not been easy," says Scott Belcher, president and CEO of ITS America. "It has been a lot of hard work. We wouldn't be where we are if not for the investment of some visionaries, and companies that were willing to take on some challenges and really stick it out."

Belcher notes that when the world first stumbled upon the vision of using technology to solve transportation problems, a lot of the private sector thought ITS would be a big pot of gold at the end of the proverbial rainbow. "But technology doesn't necessarily work that way," Belcher continues. "And I think a lot of the government agencies thought ITS was going to solve all their problems, and it didn't happen nearly as quickly as expected. With that as a backdrop, however, we have seen a number of significant accomplishments in ITS."

"Editor's note — As this issue of Pulse was being created, it was announced that Scott Belcher would be leaving ITS America at the end of October 2014 to become CEO at the Telecommunications Industry Association. Best wishes to Mr. Belcher and our sincere thanks for the insight he provided to this article."

ITS in the Mainstream

One of the greatest changes in the ITS industry over the past two decades is the fact that technology has grown to become a mainstream aspect of transportation on every level — from vehicles to infrastructure to transportation agencies. In the US, progressive states that have embraced ITS, like Michigan, now include technology in transportation projects from the start — a very different scenario from the past.

"We have mainstreamed ITS into each department," says Kirk Steudle, director of Michigan DOT and ITS America Chair.

Transportation technology has also become accepted — and even demanded — by the general public. While 20 years ago the average person would not associate transportation with technology, today ITS has become embedded in the way all people relate to transportation in the US and the rest of the developed world.

"What drove much of the public's acceptance of ITS is smartphones," Steudle explains. "It is about having information at your fingertips. The demand for information is what really helped ITS become much more accepted in all of society."

"Look at the success of traveler information," Belcher adds. "States are getting record numbers of hits on their 511 systems. People expect to have information all the time, and they are becoming much more reliant on transportation technology."

Steudle says that Michigan DOT now receives comments from the public when a traffic signal is not actuated. "People are beginning to demand more of that immediate response from the infrastructure as well."

"What drove much of the public's acceptance of ITS is smartphones. It is about having information at your fingertips." — KIRK STEUDLE, DIRECTOR OF MICHIGAN DOT AND ITS AMERICA CHAIR



"It has been interesting to watch the transformation in the 511 systems as we went from signs to phones to websites," Belcher adds. "We used to get the data from loops, and then it became cameras and radar." The movement towards dynamic pricing has also been a significant accomplishment of ITS, says Belcher. The evolution of HOT (high occupancy toll) lanes and dynamic pricing for parking show that ITS enables society to incorporate basic economic principles into transportation operations.

Onboard Technology

While most of the ITS deployments over the years have focused on infrastructure, the vehicle has become a major focus in ITS, especially in recent years.

"The biggest accomplishment is now we are talking about the vehicle as part of ITS," Steudle says.

Belcher agrees. "On the vehicle side, we have seen huge strides in safety technology to make vehicles safer and to avoid crashes," he says. "Lane departure warning, adaptive cruise control — those vehicle features are mainstream now and they certainly were not 10 years ago."

Indeed, Belcher notes that most automobile manufacturers have evolved within the last five years alone. "OEMs are now bringing outside content into their vehicles," he says.

"Connecting to the Internet and the Cloud, and aligning with companies like Microsoft, Verizon, AT&T and Google. Even 10 years ago none of those accomplishments would have been possible."

Bottom-line Benefits

There is no doubt that ITS has made major technological leaps and changed the way we interact with transportation, but what about the bottom-line benefits?

"First and foremost, improving automobile safety has been the greatest ITS benefit in the past 20 years," says Randy Iwasaki, executive director of the Contra Costa Transportation Authority in California. Iwasaki says the evolution of safety features that are now available, such as anti-lock brakes, airbags, electronic stability control, installation of sensors and cameras, have all had a significant impact on reducing automobile-related fatality rates in the United States. "ITS saves lives, period," he adds. "In 1993 there were 40,150 motor vehicle fatalities in the United States, in 2013 there were 32,850 fatalities. I believe that new ITS technology in cars is saving more lives than ever before."

1993

MOTOR VEHICLE FATALITIES IN THE USA

"We are all motivated to get to zero fatalities." — SCOTT BELCHER, PRESIDENT AND CEO OF ITS AMERICA

2013



40,150 fatalities in 1993



32,850 fatalities in 2013

While most agree that ITS improves safety, some in the ITS industry are not satisfied with the results.

"We have not seen the decrease in fatalities that we are all working towards," Belcher admits. "We are all motivated to get to zero fatalities."

Belcher points out that the number of traffic fatalities has started to rise again in the last few years, but says this could be due to an increase in vehicle miles traveled, and agrees that, while the number of fatalities is unacceptably high, as a ratio ITS has made driving much safer. "We are probably getting to the limit of what we can do to save people's lives when they get in crashes," Belcher adds. "The next generation of ITS—connected vehicle technology and some of the other technology advancements with cameras and radar—will start to have an impact on fatalities because we are now focused on preventing crashes from happening in the first place."

Safety has been the major driver behind ITS in the US, however there are many other tangible benefits of this technology.

"A secondary, but equally important benefit has been the deployment of ITS strategies to improve mobility," says Iwasaki. "The deployment of new systems has allowed engineers and planners to gather data from multiple sources and turn it into actionable information for the public."

ITS is also having a major impact on driving down emissions, via technologies such as traffic management, electronic tolling and electronic weigh stations. In a presentation at the 2014 ITS World Congress in Detroit, Michigan this past September, Belcher pointed out that ITS can make proven reductions in congestion, fuel consumption and emissions. As an example, he cited Los Angeles County in California employing traffic signal synchronization to save drivers 31.3 million hours of travel time and 38 million gallons of fuel.

"Regarding non-recurring congestion from accidents, we see a huge benefit there," adds Steudle of MDOT. "Our traffic operations center in Detroit can see all of southeast Michigan, and we can respond much faster when there is an incident on the freeway."

"ITS enables quicker, more appropriate deployment to incidents," agrees Fink of TxDOT. "Before ITS implementation, traffic managers had to deploy drivers or helicopters to view and report on-site crashes and estimate traffic flow. The cost in manpower and equipment was significant, not to mention time lost in inaccurate responses to life-threatening conditions. Now, traffic management centers use CCTV to view crashes and gather information to dispatch appropriate responders."

ITS SAVES CALIFORNIA

31.3 million
hours of travel time



38 million
gallons of fuel



11 dollars
in value returned for every
dollar invested in ITS



Cost-Benefit Analysis

When looking at the benefits of ITS versus the dollars spent, most experts agree that ITS has been worth the investment.

"There has been a return on investment for ITS," confirms Dellenback of SwRI. "I believe traffic management systems have allowed us to slow down freeway expansions as we better utilize our existing capacity."

"Many ITS options give 50 percent of the infrastructure construction equivalent but at 20 percent of the cost and 15 percent of the time," adds Eric Sampson, a professor at England's Newcastle University and ambassador of ITS-UK.

Many others agree. TxDOT's David Fink says the return on ITS investment is much greater today, and, as technology continues to evolve, will progressively increase. For a conservative estimated ROI, he offers 11:1, meaning for every one dollar spent in operating and deploying ITS, the return to the general public is about \$11.

"In Europe the ROI from ITS has varied from three percent to over 100 percent," adds Sampson, who also agrees there has been a substantial drop in the cost of components for systems and complete ITS products and services. "As a working guide I would suggest 15 percent is usually easily achievable."

"Regardless of the amount of money spent, I think the number of lives saved by advances in automobile safety that have come from ITS research and deployment is absolutely worth the investment," Iwasaki concludes.

"I think the number of lives saved...from ITS research and deployment is absolutely worth the investment." — RANDY IWASAKI, EXECUTIVE DIRECTOR OF THE CONTRA COSTA TRANSPORTATION AUTHORITY IN CALIFORNIA

RETURN ON INVESTMENT

"It has been interesting to watch the transformation...as we went from signs to phones to websites...We used to get the data from loops, and then it became cameras and radar." — SCOTT BELCHER, PRESIDENT AND CEO OF ITS AMERICA



Paris held the first ITS World Congress

ITS Around the Globe

Although the first ITS World Congress held in

1994 in Paris represented the start of a global movement to promote intelligent transportation systems, and ITS is deployed more than ever around the world, each region has its own needs and goals.

"It is interesting to see the variability in ITS focus around the world based on culture," Steudle notes. "The culture of how people move around, and the culture of how people adapt to technology is different." The car-centric US has been a leader in ITS, but some experts say its position has slipped in recent years, in relation to the momentum of ITS in Asia and Europe.

"I believe that ITS in the US is still working to catch up to the rest of the world," Iwasaki says. "There is a great passion for technology, particularly ITS, in the United States, but our regulatory agencies aren't able to keep pace with advances in technology and that has inhibited innovation and deployment of solutions by US companies. As a nation, we're also working on how to address the problem of integrating new software applications and programs with legacy systems that are prohibitively expensive to replace."

"However, the US is catching up quickly, and in my opinion ITS is beginning to look remarkably similar

all over the world," he adds. "Safety is a concern everywhere, and ITS offers solutions."

Belcher feels the US recently took a huge step forward. General Motors CEO Mary Barra announced to ITS World Congress attendees that GM will offer semi-autonomous driving featuring vehicle-to-vehicle communications technology on some 2017 Cadillacs, making GM the first automobile manufacturer to do so. They have also partnered with Michigan DOT to deploy 120 miles of roadway in the Detroit area to support connected vehicles.

"The USDOT's announcement that it will regulate connected vehicle technology is very important," says Belcher. "I think the United States has reasserted its leadership in the ITS space."

Meanwhile, Asia is aggressively pursuing ITS. For example, Japan has a significant deployment of vehicle-to-infrastructure technology. Singapore, Korea and Taiwan are making similar progress.

ITS applications are now incorporated in some form in all new vehicles and major road projects in Australia as well, according to the Australian Department of Infrastructure and Regional Development.

Europe has also been a significant adopter of ITS technology, often with the goals of mobility and reduced traffic in mind, incorporating ITS to support trains, rapid transit and even bicycles and pedestrians.

"Some EU countries see ITS as a path to greater safety—even 'zero fatalities,'" explains Sampson of ITS-UK. "Others see a mixed gain of more comfortable and more economical journeys for both people and goods with an enhanced safety case. Most EU countries value enhanced real-time information and are comfortable with the principles and the politics of road user-charging schemes."

But Sampson also notes that the richness of the European scene is also a weakness. "Different national approaches frequently mean a much reduced ITS service when crossing a border," he adds.

Belcher agrees. "Europe is similar to the US in the sense that we have to deal with states having different priorities, and Europe has to deal with each country's different priorities. The European Union has invested in research and deployment to overcome some of those hurdles."

The Developing World

Although the developing countries are adopting ITS at a slower rate, experts expect ITS to make an impact on these nations in the future. Currently, China and Latin America are leading the way.

"China is leapfrogging other countries in their deployment of ITS, because it is all greenfield development," says Belcher. "But in other parts of Asia—such as India and Indonesia—we are not seeing the same extent as China, because their transportation challenges are so extreme."

However, Sampson points out that developing countries, like China and Russia, face the challenge of bureaucracy subject to political, rather than transport-related, objectives.

In Latin America, Belcher notes that Mexico is having success with electronic tolling, having bypassed the hurdles the developed world had to deal with. He also says Brazil, Chile and Argentina have developed advanced uses of ITS, but not in a coherent strategic way, like in the developed world.

"Much of the developing world's basic transportation needs are not at the point where having technology like traffic signal prioritization would make much of a difference," Belcher warns. "First they need to get roads down. ITS deployments can make more impact in the urban megacities."

Belcher says obstacles to ITS in the developing world include funding, vision, and a good understanding of technology-availability and return on investment.

"To utilize ITS, the roadway infrastructure has to have some maturity, and electronics are required to be deployed — this will likely be a financial burden for developing countries," Dellenback confirms.

But there is a positive outlook for the future. "When undeveloped nations acquire vehicles in the future, most of the ITS development work will already be done, and these nations will reap the benefits of research and testing being done today," says Iwasaki.

"There is a huge opportunity in the developing world to not go down the same path we did, but rather leapfrog and catch up faster," Steudle agrees.

"It could be argued that it is a wise decision to be second — to let the pioneers make the mistakes and set up systems with high operating costs so that you can watch, learn and then do better when you come to buy," Sampson concludes. "Bodies such as the World Bank have been trying to push developing countries to be second adopters' and

"The improvements of ITS over the past 20 years have built a foundation for the next generation of technology...The next step is...that vehicles communicate directly with each other." — DAVID FINK, DIRECTOR OF TRANSPORTATION MANAGEMENT FOR TXDOT



"There is a huge opportunity in the developing world to not go down the same path we did, but rather leapfrog and catch up faster." — KIRK STEUDLE, DIRECTOR OF MICHIGAN DOT AND ITS AMERICA CHAIR

DIRECTOR OF MICHIGAN DOT AND ITS AMERICA CHAIR

take what is known to work, and where the costs are stabilizing, rather than try to deploy the latest and the best."

The Next 20 Years

With connected vehicle technology on the verge of revolutionizing our transportation systems — both vehicle-to-vehicle and vehicle-to-infrastructure communications — the potential for ITS may be greater than it has ever been before.

"Huge progress has been made in ITS," Belcher states. "It may not have been as quickly as some people hoped, but I think we are poised for a major advancement now. I am really optimistic about it."

Belcher and other experts predict that a few ITS-enabled megatrends will shape transportation in the future. Some of these megatrends include car-sharing, data and analytics, and the "Internet of Things" but clearly the two most important are connected vehicles and autonomous vehicles.

"Soon we will see commonplace vehicle-to-vehicle communications, and this innovation will save lives and reduce traffic crashes," Fink asserts. "The improvements of ITS over the past 20 years have built a foundation for the next generation of technology — the autonomous vehicle. The next step is to cut out the middle man — the driver — so that vehicles communicate directly with each other."

"We are on the cusp of seeing connected vehicles become a reality," Belcher agrees. "However, if we don't deploy quickly, in the next couple of years, we will lose it."

Many decisions still need to be made, but much of the technology is here now, built on the hard work and commitment of the ITS industry and transportation agencies for more than two decades. From this perspective — looking back at the history of ITS and towards its exciting future — one could say the connected autonomous vehicle has been the destiny of ITS all along.

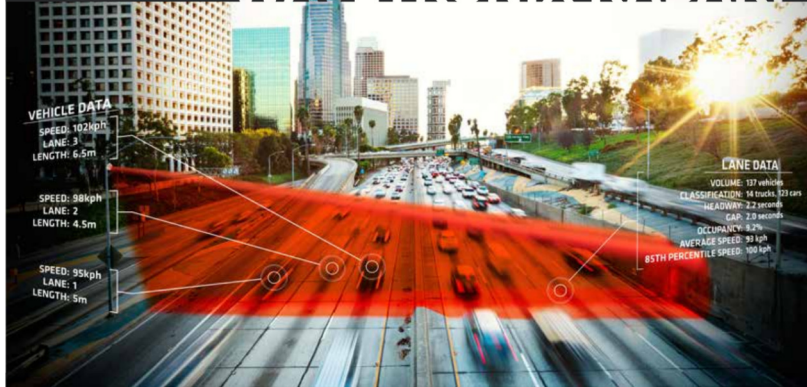
"With regard to the future of connected and autonomous vehicles, there are still many questions," Belcher concludes. "Does the infrastructure have to stay the same? Do we still need traffic signals? Do we need traffic lanes? These are questions that will impact transportation planning for the next 20 years. We don't have all the answers yet, but these are very interesting questions." ■

Pete Goldin is a freelance journalist specializing in transportation and technology. He has written for magazines such as ITS International, World Highways, Parking World and the ITS Daily News at the ITS World Congress. Mr. Goldin can be reached at petegoldin@gmail.com.

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