It has been a busy summer for ITS Midwest, and we are looking forward to keeping the momentum going right into the 2019 ITS Midwest Annual Meeting! "Midwest Connections: Travel Smart" will be held on September 26 & 27 in Downers Grove, IL. Conference co-chairs Justin Potts and Brian Plum have been working with their dedicated team to deliver a must-attend event. ITS Midwest Past President David Zavattero is creating a strong technical program that includes topics like smart cities, connected & autonomous vehicles, and public/private partnerships. Our marquee sessions include an executive panel with representatives from all four ITS Midwest members states, a keynote address by ITS America President Shailen Bhatt, and the announcement of the Project of the Year. Thanks as always to ITS Midwest Vice President (Indiana) Dan Shamo for spearheading the Awards Committee. There will also be many opportunities for networking, an evening social event, and a behind the scenes tour of O’Hare International Airport. Be sure to register for the conference today!

While our Annual Meeting planning committee has been laser-focused on delivering our best conference yet, your Board of Directors has been busy arranging and holding events across our member states. As mentioned in my letter last month, we held a training course on “Improving Highway Safety with ITS” in Cincinnati on May 22. Participants learned about ITS-based strategies and tools for addressing safety challenges as part of this free course through the USDOT Professional Capacity Building Program. A big thanks to Ed Williams, ITS Midwest Vice President (Ohio), and his team for arranging this successful event.

On June 27 ITS Midwest partnered with ITS America and the USDOT to deliver a half-day training course on Cybersecurity Basics in Louisville, KY. The course introduced basic cybersecurity concepts with an emphasis on ITS and traffic management centers (TMCs). Participants came away with a greater understanding of the threats to securing data and systems, as well as solutions for addressing those threats. Thanks again goes to Ed Williams for making this event happen.

Back in Illinois, ITS Midwest Director (Illinois) Abraham Emmanuel organized a well-attended and informative training session on Transportation, and Jerry Quandt of the Illinois Autonomous Vehicle Association. Ann Schlenker of Argonne National Laboratory served as the moderator. Thanks to ITS Midwest Secretary/President-Elect Scott Lee for representing our organization at the event!

On July 16, ITS Midwest partnered with ITS America and the USDOT to deliver a half-day training course on Cybersecurity Basics in Louisville, KY. The course introduced basic cybersecurity concepts with an emphasis on ITS and traffic management centers (TMCs). Participants came away with a greater understanding of the threats to securing data and systems, as well as solutions for addressing those threats. Thanks again goes to Ed Williams for making this event happen.
course entitled “Assessing Readiness for Connected and Automated Vehicles” on July 24. Held at the Chicago Metropolitan Agency for Planning (CMAP) offices in downtown Chicago, the day-long event built on the USDOT’s Connected Vehicle 201 course offered twice last year in Northeastern Illinois. Participants learned how to develop an action plan for CAV deployment in collaboration with regional partners.

In addition to the Annual Meeting, we will hold our 9th annual golf outing with ILITE and WTS on August 16 in Bloomingdale, IL, and Scott Lee will be restarting the popular ITS Midwest Webinar Series this fall. Please email Scott if you would like to suggest a topic or volunteer to present.

I am pleased to report that we have received several nominations for the first annual Gordon Paesani Scholarship. This $1,000 scholarship will be awarded at the Annual Meeting to a deserving college student in one of the four ITS Midwest member states that is studying an ITS field. Thanks to Scott Lee and ITS Midwest Treasurer Bini William for working with Dan Shamo to establish this scholarship.

I would like to take this opportunity to announce a change in our membership structure. Up to this point, ITS America members have been able to extend their membership to three (3) ITS state chapters. However, this option is being phased out, meaning all members of ITS Midwest will need to register as members of the chapter directly. This will accelerate the registration process, streamline our internal finances, and clear up potential confusion about membership status. Please contact me if you have any questions. And thanks to the 72 members that have renewed for 2019! If you haven't already, please renew online – and consider nominating someone for our election.

Please be sure to follow ITS Midwest on social media to keep up with us! And, as always, please do not hesitate to bring an idea, encourage a colleague to join our membership, or offer your time to help make ITS Midwest even better. Please contact me if you would like to get engaged. Thanks!

### Transportation Funding: A Scan of Gas Taxes in the Midwest

Matt Letourneau, AECOM

America’s transportation infrastructure is vast, overstretched, and aging. The maintenance and expansion of this infrastructure, as well as its enhancement through the implementation of intelligent transportation systems and other improvements, hinges on the availability of sufficient and sustainable funding.

As talk in Washington again turns to the potential of a new transportation bill, the topic of funding sources has emerged as the key hurdle to a new infrastructure plan. For many years, transportation professionals and policymakers have predicted shortfalls in the Highway Trust Fund and other mechanisms designed to preserve our nation’s infrastructure. However, there has been a strong reluctance among most elected officials to address these funding challenges through increases to the gas tax.

Last adjusted in 1993, the Federal gas tax sits at 18.4 cents per gallon of gasoline and 24.4 cents per gallon of diesel fuel. Since that time, inflation has increased by over 70%, meaning the buying power of the gas tax is now down to 10 cents per gallon (per usinflationcalculator.com). Additionally, more efficient hybrid and fully electric vehicles have claimed a larger share of the nation’s vehicle fleet, reducing gasoline consumption while maintaining the demand on infrastructure.
In contrast to Washington, at the state level, both voters and their elected officials have begun to recognize the importance of providing sustainable funding for transportation needs. In fact, 30 states have increased their gas taxes over the past decade to strengthen funding for transportation projects.

The following text summarizes efforts to increase the gas tax in the member states of ITS Midwest.

**Indiana**

As described by Indiana Department of Transportation Commissioner Joe McGuinness at the 2018 ITS Midwest Annual Meeting, the State of Indiana increased their gas tax by 10 cents per gallon in July of 2017 and again by 1 cent in 2018 to account for inflation. These adjustments were combined with increases for registration fees and additional costs for hybrid and electric vehicles that pay less at the pump. Overall, Hoosiers now pay 29 cents per gallon of gasoline and 48 cents per gallon of diesel.

The gas tax increase has provided an influx of funding that is now fueling Indiana’s $1.2 billion highway improvement plan, which was recently updated to include several new projects at the state and local levels. Indiana is now delivering a broad range of transportation projects focused on safety, infrastructure condition, congestion reduction, system reliability, freight movement and economic viability, environmental sustainability, and reduced project delivery delays.

**Ohio**

In April of this year, Gov. Mike DeWine signed a bill that will increase Ohio’s gas tax to 38.5 cents per gallon of gasoline (a 10.5 cent increase) and 47 cents for diesel (a 19 cent increase). The bill, which passed the Ohio House 70-27 and the Senate 22-10, also introduces a $100 annual fee on hybrid vehicles and a $200 fee on electric cars. The adjusted gas tax was not indexed to inflation, meaning new legislation would be needed in the future to maintain the buying power of the funds gathered.

It is estimated that each penny of Ohio’s gas tax raises $66 million of transportation funding. Overall, the gas tax increase is expected to provide $865 million a year for road and bridge improvements, as well as $70 million for transit – a significant increase over the $33 million currently provided annually for transit. This new funding enabled the Ohio Department of Transportation to reinstate three phases of the Columbus Crossroads Project that were at risk of cancellation.

**Illinois**

Illinois has recently taken after its eastern neighbors, raising its state gas tax this year for the first time since 1990. As part of a $45 billion infrastructure bill signed by new Gov. J.B. Pritzker in July, the gas tax was increased from 19 cents to 38 cent per gallon of gasoline and indexed to inflation. The diesel fuel rate and various vehicle registration fees have also been increased, as have parking garage taxes. A proposal to increase fees on rideshare programs was excluded from the final legislation.
The result is a $1.235 billion annual increase in revenue from motor fuel taxes, which, combined with other funding sources, will fund $33.2 billion worth of transportation infrastructure improvements across the state over six years, including road & bridge, mass transit, rail, and aeronautics projects.

The push towards increased transportation funding was a long process that required advocacy at all levels. In April, several transportation officials, including former Republican US congressman and Secretary of Transportation Ray LaHood, testified before an Illinois Senate committee, describing the infrastructure bill as "a jobs bill and an economic development bill."

In Illinois, state and local governments impose additional excise and sales taxes, with amounts varying depending on where the fuel is purchased in the state. However, in the past, much of that funding was often diverted from transportation uses until a "lockbox" amendment was passed in 2016 that required gas tax revenues to go toward transportation projects. Transportation funding was further decreased in 2018 when the Illinois General Assembly removed $300 million of transportation funding from the General Fund.

**Kentucky**

In 2015, the State of Kentucky reduced its variable excise tax rate on fuel, which includes a variable tax of 9% of the wholesale cost of fuel (Kentucky is one of only 12 states that base their tax rate on gas prices). The bill established a minimum tax rate equivalent to 26 cents per gallon, regardless of the cost of fuel. Low oil prices in recent years have caused this minimum rate to become the norm. Overall, the tax reduction has resulted in an estimated $129 million decrease in annual transportation funding for the state.

In response, in 2018 and again earlier this year, state lawmakers put forth bills to increase the tax rate by 10 cents per gallon, reset the wholesale floor price for fuel implement fee increases for license plates, and introduce a $175 fee for electric vehicles. However, neither bill made it to a vote before the legislative session concluded and the fate of proposals to increase the gas tax in Kentucky is uncertain.

**Around the Midwest**

States adjacent to ITS Midwest have shown a willingness to prioritize gas taxes as a way to provide transportation infrastructure. Pennsylvania, Michigan, and West Virginia have some of the highest taxes on fuel in the country. While Missouri voters recently turned down a proposed 10 cent gas tax increase, state lawmakers are considering a stepped increase for 2020. Tennessee increased its gas tax by 6 cents in 2017 and Wisconsin’s new governor has called for an 8 cent gas tax increase.

It remains to be seen if the upswell of support for state gas tax increases will make its way to Washington. Lawmakers’ aversion to tax increases has shifted attention to funding alternatives like increased tolling, vehicle use/mileage fees, and private industry partnerships for infrastructure projects; however, those approaches have their own set of challenges. With members of the business community, including the US Chamber of Commerce, backing a Federal gas tax increase, elected officials may soon have enough political cover to enact the first change to the country’s gas tax in nearly 30 years.
Although automated vehicles (AV) are designed with targets to improving highway safety, when testing automated vehicles on public roads, safety issues have continuously been a concern to the general public, government agencies, as well as auto manufacturers. As long as automated vehicle technology has not achieved full automation (Level 5), human drivers are still expected to take over the steering wheel and throttles when there is an automated vehicle disengagement, which is defined by California DMV as “a deactivation of the autonomous mode when a failure of the autonomous technology is detected or when the safe operation of the vehicle requires that the autonomous vehicle test driver disengage the autonomous mode and take immediate manual control of the vehicle”.

From the safety perspective, it is essential to understand the interaction between automated driving and human drivers. According to crash reports involving automated vehicles, failing to respond to take-over requests in time is the major reason that results in these fatal crashes. Although identified as a major reason, what factors impact driver’s take-over time still remains unknown. From the perspective of preventing potential safety issues caused by AV disengagement, what the major causes that lead to AV disengagement are needed to be investigated quantitatively. With these research questions, a comprehensive and quantitative investigation of automated vehicle disengagement causes, and effects are imperatively needed to understand the mechanism of AV disengagement so as to facilitate the prevention of future crashes caused by AV disengagement. Starting in 2016, California DMV has begun to require every manufacturer authorized to test automated vehicle on public roads to submit an annual report summarizing the AV disengagements during testing. All the disengagements reports were made available to the public, which offers potential to further investigate into AV disengagement.

Earlier in May 2019, we have conducted a study that explores causes and effects of automated vehicle disengagement using statistical modeling and classification tree based on California’s field test data*. The study quantitatively investigated the AV disengagement mechanism by understanding its patterns, causes, and effects on driver’s perception-reaction time for take-over requests based on the most recent records from the California AV disengagement database. The relationship among the causes of AV disengagement, time, and vehicle sensors, as well as the relationship among the driver take-over time, roadway environment, and disengagement causes, are to be explored and quantified using multiple modeling approaches that involve statistical modeling and classification tree. In the study, the following information from the disengagement reports is retrieved and

* Song Wang and Zhixia Li. “Exploring causes and effects of automated vehicle disengagement using statistical modeling and classification tree based on field test data.” Accident Analysis & Prevention 129 (2019): 44-54
then formatted into the disengagement database of this study: manufacturer’s name; the reason why disengagement happened; the location of where disengagement happened; and time needed for human drivers to take over when disengagement happened. In addition, the levels of their driving automation, as well as the numbers of sensors (e.g., LiDAR, radar, and camera sensors) installed on each manufacturer’s testing AVs, are included in the database.

Contributing factors to cause of disengagement was investigated. According to the descriptions of the reason why disengagement happened, the causes of disengagements are categorized into three perspectives. As referring to how an automated vehicle operates on the road, the disengagement can be caused when sensing the driving environment (perception issue), then making decisions (planning issue), and eventually driving the vehicle itself (control issue).

Driver’s take-over time (TOT) was also investigated, which defined as “period of time elapsed from the autonomous vehicle test driver was alerted of the technical failure and the driver assumed manual control of the vehicle.” “0.5 seconds” is applied as a threshold to classify two levels of TOT.

The Classification and Regression Tree Model (CART) model was used to find out the relationships between the causes of disengagements or TOT and other potential contributing factors (e.g., numbers of sensors, location of disengagement).

Figure 1 illustrates the hierarchical structure of factors that impact the cause of disengagement. When automated vehicles are driving on the freeway, the vehicles are most likely to have perception issues than others. This is because the driving environment on the freeway is relatively simple than on the local roads. There are fewer traffic signals and fewer road users on the freeway compared with local roads, which automated vehicles do not make decisions frequently regarding stop/go and predict pedestrians/cyclists’ behaviors.

When automated vehicles are driving on the local roads, perception, planning, or control issues can occur with different combinations of LiDAR and radar sensors. If the automated vehicles are driving on the local roads with 5 or fewer LiDAR and radar sensors installed, the automated vehicles are most likely to have the perception issue. Therefore, according to the classification tree, the perception issue can be addressed by either increasing the number of radar sensors or LiDAR sensors. The automated vehicles are most likely to have the planning issues with the number of LiDAR sensors more than (or equal to) 5 or fewer than 3. This is because if there is a large number of LiDAR sensors installed on the vehicle, redundant data can be invited which could affect the computation of planning. In addition, if the vehicle operates with a small number of LiDAR sensor installed, the data can be insufficient which can also affect the computation of planning. Therefore, to address the planning issue, the optimum number of LiDAR sensors installed on automated vehicles is 3 or 4.

Figure 2 illustrates the mechanism of TOT. When automated vehicles are traveling on the local roads, test drivers are most likely to take over the driving within 0.5 seconds if the automated vehicle requests the driver to do so or the driver take over by himself due to consideration of safety operations. It also reveals that drivers’ take over time while driving on local roads is not affected by the cause of disengagements. When automated vehicles are traveling on the freeway, the cause of disengagement determines how long it takes drivers to take over. Disengagements caused by either the perception or the control issue extend the take over time. It is important for drivers to take over as soon as possible if needed. For the extended take-over time due to a control issue, it can be addressed by focusing on the interaction between the automated driving system and the vehicle itself.
Illinois has been a national and international leader in the development and deployment of Intelligent Transportation Systems (ITS). Illinois ITS development started in the 1960’s when the IDOT Traffic Systems Center (TSC) established one of the first real-time expressway surveillance and management systems in the world. Illinois was an early leader in the expressway management applications such as reversible lanes, express lanes, ramp metering, and Emergency Traffic Patrol. Since this start, IDOT has continued to apply ITS technology to promote safer, more reliable, and more efficient travel. This article is intended to provide an update of recent and planned Illinois ITS activities.

**Illinois Statewide ITS Architecture and Strategic Plan** - IDOT has just completed the update of the Illinois Statewide ITS Architecture and Strategic Plan. This effort lays the groundwork for the projects and policies that will guide IDOT’s ITS efforts in the future. The plan has involved extensive coordination and numerous meetings in 13 urban areas with MPO’s, counties, municipalities, emergency service and transit agencies, and other organizations.

The Strategic Plan process is one of the mechanisms used to identify and develop ITS policies and projects, and the ITS Architecture helps determine the inter-agency relations needed to make the projects successful. The Architecture and Strategic Plan has established a framework to efficiently use technology to solve transportation problems and to make better use of the existing infrastructure. IDOT will balance the continued deployment of traditional ITS assets with recent technological advancements that will provide for the installation and operation of advanced transportation technologies that improve safety, efficiency, system performance, and return on investment.

The updated Statewide ITS Architecture and Strategic Plan also embodies and addresses technological advancements and ITS applications such as:

- Expressway Managed Lanes
- Real-Time Traveler information Systems
- Active Traffic and Demand Management
- Advanced Traffic Management Systems
- Vehicle to Vehicle (V2V)
- Vehicle to Infrastructure (V2I)
- Autonomous Vehicles
- Road Weather Management
- Bus-on-Shoulder
- Arterial Bus Rapid Transit
- Arterial Transportation Management
- Central Traffic Signal Control Systems
- Work Zone Safety ITS / Technology Applications
- Traffic Incident Management
- Commercial Vehicle Operations/Freight Issues
- Truck Parking Management
- High Speed Rail
- Positive Train Control
- Grade Crossing Protection
- Autonomous Bus, Connected Bus, Electric Bus
- Autonomous taxi
- Infrastructure condition monitoring
**IDOT Traffic Management** - IDOT staffs and manages regional Operations centers and Traffic Management Centers (TMC) throughout the state. District 1 in Schaumburg performs centralized incident and communications coordination for the Chicago area, including operation of automated reversible lane access control for the entry ramps into the Kennedy (I-90/94) expressway seven-mile long reversible lanes, and the Roosevelt Road ramp control system on the Eisenhower Expressway. They are also installing fiber interconnects for a developing centralized traffic signal management system. District 3 partners with District 1 for dynamic message sign interoperability and messaging. District 4 has integrated computer aided dispatching with local police and has established ATMS connections to District 6, Bloomington, and Galesburg. District 6 continues to install fiber around Springfield and will tie in traffic signals to the communications network as it expands. District 7 has added new DMS, while District 8 is updating and expanding ITS infrastructure. District 9 is planning to deploy a performance management signalized corridor.

Tying these various operations together, the IDOT Station One center located in the IDOT Central Office Headquarters in Springfield provides coordination, central emergency planning, and backup operations for all IDOT TMC’s. The Station One facility is in the early stages of a renovation and expansion that will increase their abilities to provide Statewide coordination. IDOT is beginning a Statewide ATMS Study to explore the necessary investments in communications, hardware, software, and personnel to better interoperate these various communications centers.

**Emergency Traffic Patrol** - In October 1960, the Emergency Traffic Patrol began official operations on Chicago’s expressways to assist stranded motorists. The Patrol was equipped with flares, barricades, radio telephones, compressed air, push bumpers, and a few gallons of fuel. Public response to the patrol was overwhelmingly positive, and in the spring of 1961, the Division of Highways made the Emergency Traffic Patrol (ETP) “Minutemen” a permanent program and expanded its operations throughout the Chicago expressway system.

Today, IDOT motorist assistance programs cover the Chicago area and Metro East St. Louis area expressways and operate on a 24/7/365 basis. These programs enhance public safety through the early detection of incidents and traffic disruptions, accompanied by a rapid response to clear such events. This helps restore traffic flow and reduces the chances of secondary incidents on a crash scene.

**Work Zone Safety** - IDOT uses ITS to promote work zone safety to make travel through and around work zones safer and more efficient. These measures include Queue Detection and Warning systems, the deployment of camera surveillance system in construction zones to enforce speed limit laws, and assist with incident management.

**Traffic Incident Management Training** - IDOT has worked through the Illinois Center for Transportation, Southern Illinois University Edwardsville, and FHWA to establish the Traffic Incident Management Training Program. This Program combines on-line training and a multi-agency in-class session which includes participants from all disciplines involved in incident management and is the first multi-disciplinary class of its kind in Illinois. The course provides responders with information and best practices that improve their safety at traffic incident scenes and is now mandatory for private towing operators working under IDOT incident contracts.

**Illinois Tollway I-90 (Jane Addams) Managed Lanes** - The Illinois Tollway has completed the reconstruction of the Jane Addams Memorial Tollway (I-90) with the latest technologies to make the roadway safer and more efficient for Tollway customers. The new roadway incorporates active traffic management, integrating transit and introducing the Tollway’s first SmartRoad. Data collected from the corridor is shared with naviga-
The Interstate 94 & US Route 41 Smart Highway includes:

- Active Traffic Management using data and video collected by the Tollway’s Traffic and Incident Management Center to provide real-time information to drivers including travel times, traffic incident advisories, lane closure and traffic pattern changes, as well as the ability for Pace buses to drive in the shoulder lanes. SmartRoad high-tech gantries are located every half mile between Barrington Road and the Kennedy Expressway to communicate with drivers.

- Upgraded Dynamic Message Signs - New over-the-road dynamic message signs feature high-resolution, full-color graphic capability to enhance communication throughout the corridor. In addition, the I-90 SmartRoad gantries features smaller, four-color dynamic message signs to direct and inform drivers of lane closure and traffic pattern changes.

- State-of-the-Art Wireless Traffic Sensors provide comprehensive travel time information and ramp monitoring to alert drivers of potential backups.

- Upgraded and Expanded Camera System are digital high-definition, to enhance the Tollway’s ability to pan and zoom in and out to better respond to roadway incidents. Camera coverage has been increased to provide for viewing along the full length of the I-90 corridor from the Tri-State Tollway (I-294) to Rockford.

- New Weather Stations - Upgraded weather stations along the I-90 corridor offer state-of-the-art technology capable of providing pavement monitoring and weather condition information at critical locations, including bridges on the system, to monitor and report on snow and icing conditions.

The new I-90 includes flexible infrastructure that will enable the Tollway to add new “smart” features as needed or as they become available in the years to come. This includes Vehicle-to-Infrastructure Communication which will allow Tollway infrastructure to communicate with cars over a wireless network, exchanging data about each vehicle’s speed, location and direction of travel and providing feedback to drivers to react to developing situations.

**Illinois Tollway I-294 Central Tri-State Construction Project** - The $4 billion Central Tri-State Tollway (I-294) Project will reconstruct I-294 from Balmoral Avenue to 95th Street to provide congestion relief meeting current and future transportation demands. Construction work in 2019 includes reconstruction of the Mile-Long Bridge between Hodgkins and Willow Springs, and the Burlington Northern Santa Fe (BNSF) Railway Bridge in Hinsdale and Western Springs. The project includes the repairing, resurfacing and widening of I-294 to five lanes between Balmoral Avenue and Wolf Road, the removal of the O’Hare Oasis pavilion, and pavement repairs to the Balmoral Avenue Bridge over I-294. The project also includes reconfiguring the I-290/I-88 Interchange at I-294, as well as integrating Flex Lanes and SmartRoad technology.

**Edens Smart Highway** - The Interstate 94 (I-94) and US Route 41 (US 41) Smart Highway project will provide significant improvements to safety, operations and maintenance to a heavily congested corridor through the deployment of Intelligent Transportation System (ITS) field assets to expand the Illinois Department of Transportation’s (IDOT) roadway and incident management operations.

The project includes the installation of a fiber optic backbone the length of the corridor connecting to existing IDOT ITS assets, lighting controllers, pump stations, weigh stations, and will provide a communications path for the Illinois Tollway and Lake County Department of Transportation to the IDOT Gateway. ITS elements include the installation of additional dynamic message signs (DMS), closed circuit television (CCTV) cameras, vehicle detection systems, ramp metering and ramp queue detection systems, passive and active wrong-way vehicle detection and alert systems, road weather information stations (RWIS), LED roadway lighting on I-94 and portions of US 41, and advanced traffic signal control systems.

**Illinois – I-55 Managed Lanes Project** - Illinois has studied the implementation of Managed Lanes on the segment of I-55 between I-355 (Veterans Memorial Tollway) to I-90/94 (Dan Ryan Expressway) located in DuPage and Cook Counties. The I-55 project will incorporate Active Traffic Management strategies to utilize technology to monitor changes in traffic conditions, moderate traffic flow,
and provide motorists advanced information on travel conditions. Advanced Traffic Management System (ATMS) technologies may include adaptive ramp metering as well as dynamic lane use control, speed limits, and message signs to provide information such as approaching speed reductions, lane blockage, and congestion will be communicated in real time to alert motorists to upcoming travel conditions.

This segment of I-55 includes the area of current operation of the very successful Pace I-55 Bus-on-Shoulder project. The I-55 Managed Lanes project will further improve Pace bus operations by bus use of the managed lanes for the entire 25-mile corridor.

The I-55 Managed Lanes project is being considered for a Public-Private Partnership (P3) option to construct and manage the project, and has identified an Express Toll lanes (ETL) option based on its adaptability to the existing regional, operational and corridor constraints. A P3 offers the possibility of leveraging limited public resources with private investment to implement projects that could otherwise not be afforded. In addition, a P3 can also provide expedited and more economical project delivery methods and long-term management options.

Illinois – I-290 Reconstruction Project
- Illinois DOT has completed study on the thirteen mile segment of I-290 study area which extends from west of Mannheim Road to Racine Avenue and passes through eight communities: Chicago, Bellwood, Broadview, Forest Park, Hinsdale, Maywood, Oak Park, and Westchester.

The proposed plan for I-290 includes a full reconstruction of approximately nine miles of pavement and bridges to accommodate an additional lane (four lanes total in each direction). The new lane may be a High Occupancy (3+ passengers) and Toll lane. The new ITS systems include Active Traffic Management and upgrading and modernization of the existing ramp metering. A multi-purpose gantry system will hold toll rate signs, toll readers, ATM signs, dynamic message signs (DMS), and standard traffic signs.

The vehicle detection system will provide volume, speed, lane occupancy, and vehicle classification data for system management. The data from detectors can be used to set toll prices, provide travel time and congestion messages, create vehicle classification and traffic data sets, and determine advisory speed limits, as well as run an adaptive ramp metering program. If a toll system is required, it is expected that any necessary tolling equipment and signing would be accommodated within the ITS gantries.

Arterial Traffic Signal Management Systems - the most prominent example of arterial-level traffic management in Illinois is the Lake County, Illinois PAS-SAGE Transportation Management Center (TMС). Located in Libertyville, Illinois, the 5,000-square-foot TMC opened in 2006 and manages over 500 signalized intersections throughout Lake County. The system also includes Pan-Tilt-Zoom (PTZ) cameras, intersection approach detection cameras, and an extensive fiber network. Traffic data and camera images are outputted to real-time traffic information maps by Lake County, as well as the Travel Midwest and Getting Around Illinois websites. Kane County, DuPage County, the City of Chicago, and the City of Naperville have also deployed arterial transportation management systems.

In the Chicago CMAP region, IDOT will lead a Regional Arterial TMC study which will explore the integration and coordination of the various state, county, and municipal TMC’s.

Arterial Bus Rapid Transit – PACE Suburban Bus and CTA Bus are currently exploring and deploying Arterial Bus Rapid Transit projects. These projects combine Transit Signal Priority and roadway improvements including queue jump lanes and Intelligent Bus Systems along arterial routes.

Transit Signal Priority promotes on-time performance and travel time reliability by giving the bus priority at traffic signals by extending a green, shortening a red or providing queue jumps. There is evidence of this along Cermak Road where Transit Signal Priority has been active for several years; with a 7 to 20% reduction in transit travel times along this route. Queue jump lanes are short stretches of bus lanes at traffic-signal controlled intersections; these by-pass lanes allow buses to by-pass waiting queues of traffic and move to the front at signalized intersections.

Pace’s new rapid transit network, Pulse, will provide enhanced express bus service to commuters using the latest technology and streamlined route design. Pulse is designed to provide fast, frequent and reliable bus service in heavily traveled corridors of suburban Chicagoland. The first line on Milwaukee Avenue launches August 11, 2019. Pulse rapid transit service differs from regular fixed route bus service by offering limited-stop express service, vehicles equipped with Wi-Fi and other technological advancements, easy-to-find stations with weather protection, and real-time bus arrival signage, and easy on/off boarding.

Expressway Bus-on-Shoulder (BOS) – Illinois current and proposed Bus-on-
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shoulders (BOS) programs include:

- **I-55 Expressway Bus-on-Shoulder** - Pace Suburban Bus runs BOS operations on the Interstate 55 (Stevenson Expressway) left shoulder as a priority treatment for transit under congested highway conditions. Buses can use the shoulder when mainline traffic is moving at less than 35 miles per hour (mph), and buses shall not exceed the speed of traffic by more than 15 mph with the maximum speed being 35 mph.

- **I-90 (Jane Addams Tollway) Bus-on-Shoulder** - Pace and the Illinois State Toll Highway Authority have incorporated a “flex lane” to accommodate BOS service on the Jane Addams Tollway (I-90).

- **I-94 (Edens Expressway) Bus-on-Shoulder** - IDOT is currently implementing construction to accommodate Pace BOS service on the I-94 (Edens Expressway) corridor. The proposed limits are along Interstate 94 from West Foster Avenue to the Edens Spur interchange, and US 41 from the Edens Spur interchange to Lake Cook Road in Cook County, a length of approximately 14 miles.

**Gateway Traveler Information System** - IDOT started the Gateway Traveler Information System as part of a Gary/Chicago/Milwaukee I-94 Corridor initiative in 1994. The Gateway collects transportation related information from geographically dispersed systems, validates and fuses the information collected, and disseminates it to the public and to private partners. The information handled by the Gateway includes incidents, construction, and planned events that affect traffic operations, data from field devices such as vehicle detectors, cameras, DMS, HAR, and weather sensor stations; as well as derived traffic measures such as congestion, travel times, and speeds. The Gateway interfaces with traffic management centers, transit operators, emergency dispatch centers, police and fire departments, weather systems, and traveler information service providers. The Central Gateway and Illinois Gateway hubs integrate GCM and Illinois ITS components. The Gateway provides real-time traveler information to the IDOT statewide traveler information website [www.gettingaroundillinois.com](http://www.gettingaroundillinois.com) as well as the multi-state [www.TravelMidwest.com](http://www.TravelMidwest.com) website.

**RWIS (Roadway and Weather Information System)** - The IDOT RWIS system provides information used in the planning, implementation and evaluation of resources devoted to minimizing the impacts of snow and ice on the state-maintained highway system. Information is gathered and monitored at about 50 locations around the state to indicate current conditions, as well as feed data to forecasters predicting potential pavement conditions.

**Automated Vehicle Location (AVL)** - IDOT is implementing an automated vehicle location (AVL) dispatch system for all IDOT radio-equipped vehicles. The system will provide for weather data collection and reporting for IDOT maintenance vehicles and to assist in winter operations management.

**Connected Vehicles and Autonomous Vehicles** - Illinois has established an Autonomous Illinois initiative focused on the continued development and deployment of connected and automated vehicles within the state. The initiative is combined of state agencies and community partners working to create a new state of mobility through serving as a national leader in the development and use of connected and automated vehicles (CAV).

The Illinois Tollway is conducting a Connected Vehicle (CV) Pilot Project that features the early deployment of a small number of connected vehicle assets along 10-miles of I-90 from Arlington Heights Road to just east of Rte. 59, serving as a proof of the concept of using CV technology to collect useful traffic data directly from vehicles. This demonstration leverages the technology investment the agency has already made in
the I-90 "Smart Road" by integrating CV technology into the roadway at a small incremental cost.

There are two firms actively testing CAV technology in Illinois. Innova EV has partnered with Choose DuPage and the Village of Itasca on a first mile-last mile solution connecting employees and residence of the Hamilton Lakes Business Park to and from the Itasca train station.

Autobon AI of Lisle, and MSD Express of Elgin, IL have partnered to retrofit MSD fleet vehicles with Autobon’s advanced highway autopilot system. In the current phase, MSD Express’ retrofitted vehicles are collecting extensive system performance and roadway data that will be used to further the development of Autobon’s future autopilot technology.

**Commercial Vehicle Operations** – Illinois is a CVISN core compliant state and has implemented a Commercial Vehicle Information Exchange Window (CVIEW) application for the collection, distribution and exchange of motor carrier safety, registration and taxation information for the State of Illinois. State and local enforcement officers use the CVIEW system to identify high-risk carriers for their enforcement and inspection activities. The system also provides on-line application for the submittal and payment of International Fuel Tax Agreement (IFTA) applications and returns under the management of the Illinois Department of Revenue (IDOR). IDOT also operates an Automated License Plate Recognition (ALPR) and US-DOT Number Recognition project at the I-55/70 Maryville weigh station.

The State will soon begin an update of its Innovative Technology Deployment Program Plan/Top Level Design document to become eligible for Expanded Innovative Technology deployment funds which will allow further CVO-oriented projects.

**Truck Parking Management** - Following upon the Mid America Association of State Transportation Officials (MAAS-TO) Truck Parking Information Management Systems (TPIMS) effort, IDOT has launched an effort to install TPIMS equipment in all IDOT Interstate Rest Areas. The project is intended to improve rest area security, reduce time searching for parking, and to provide real-time information to truck drivers through smart phone applications and traveler information websites. Deployment is anticipated in 2020 and 2021.

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**Clear Signals: How to use Automated Traffic Signal Performance Measures (ATSPMs) to keep your signals healthy**

Shannon Hebert, ITS Marketing Manager at Miovision

Smart cities aren’t formed overnight. All over the world, cities find themselves at various stages of defining and building strategies to achieve their smart city goals. But, while their goals may differ, a common smart city vision remains: improving the lives of all citizens.

At Miovision, we believe smart cities start at the intersection. Smart intersections not only make roads safer, but they can also improve mobility for citizens, help transit arrive on time, reduce congestion, improve freight mobility and emergency response time.

Many vendors would have you believe the only way to achieve smart city status is to rip out your existing infrastructure and replace it with new technology. What they might not tell you is that do-
ing so could lock you into a closed system for the next 50 years. Talk about stifling innovation.

At Miovision, we offer real solutions, like TrafficLink, to help make cities smarter one intersection at a time. With Automated Traffic Signal Performance Measures (ATSPMs) from TrafficLink, city traffic engineers can access the data they need to make sure intersections are healthy and operating well, in turn making cities smarter. And, rather than lock cities in, our solutions are open and work with existing infrastructure so there’s no need to rip and replace.

So, how do ATSPMs help you maintain healthy intersections and make your city smarter?

Over the last two years here at Miovision, we’ve been using ATSPMs to conduct a wide range of analysis at intersections across North America. We’ve used ATSPMs to ensure intersection health at three levels: maintenance, operations, and optimization. At the maintenance level, ATSPMs can help ensure signals, detectors, and communications are performing correctly in order to generate reliable data. Once maintenance issues are resolved, we can use ATSPMs to identify the key components that must be functioning properly at the operational level in order to attain intersection health. From there, we can optimize signalized intersections using ATSPM data, by flagging and addressing performance-related issues.

Once intersections are healthy and performing at their best, it’s important to maintain that trend. Many factors, including population growth, real estate developments, and road closures contribute to traffic congestion in cities. ATSPMs can help traffic engineers make incremental updates to the network to mitigate congestion and keep people and goods moving safely through cities. By completing ongoing analysis of intersection and corridor performance with ATSPMs, it’s easy for traffic teams to uncover problem areas and know where to focus their efforts. What’s more, with detailed before-after studies, traffic teams can prove the effect of changes to the traffic network to demonstrate ROI.

As agencies begin to adopt ATSPMs to assess their traffic networks, they need information around how this data is actually implemented to help maintain healthy intersections. That’s why we created our eBook – **Clear Signals: How to Use ATSPMs to Keep Your Intersections Healthy**. It’s a how-to guide that provides direction to help traffic engineers understand how ATSPMs can become part of their ongoing efforts to maintain intersections and corridors that operate effectively, and efficiently to ensure intersection health. To download a free copy of our eBook, visit the link at [https://miovision.com/its-atspms](https://miovision.com/its-atspms).
Join us for the 2019 ITS Midwest Annual Meeting on September 26-27 at the Doubletree Suites by Hilton Hotel & Conference Center Chicago-Downers Grove. The Doubletree Suites will also serve as the meeting hotel, with rooms at a special group rate.

"Midwest Connections: Travel Smart" is the Annual Meeting theme. This two-day event will consist of roundtable panel discussions, technical sessions, a vendor showcase and an exhibitor open house (featuring over 30 exhibitors), social events and technical tours.

**Why attend?**

**Attendees**: 130+

**Exhibitors**: 30+

**Private sector reps**

- from multiple industries

**Government, State, & City reps**

13 Topics Covered

- Smart Cities
- connected and autonomous vehicles
- traffic management and operations
- multi-agency collaborations
- work zone ITS

- safety innovations
- corrective and preventive maintenance
- privacy issues
- data management
- commercial vehicle operations

- transit applications
- Incident management
- new technologies

Let's shape the future of ITS together
Are you ready for #itsmw19?

Secure your spot at the premier ITS event in the Midwest:
Register today at www.itsmidwest.org/2019-Annual-Meeting/register/
Early bird registration rates through Sep. 20th, 2019*
*cost of social events not included

Social Events

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 25, 2019</td>
<td>ITS Midwest Golf Outing at Ruffled Feathers Golf Club</td>
</tr>
<tr>
<td></td>
<td>Lemont</td>
</tr>
<tr>
<td></td>
<td>Sign up while registering online for #itsmw19.</td>
</tr>
<tr>
<td></td>
<td>Ruffled Feathers G.C. is the only Pete Dye design in</td>
</tr>
<tr>
<td></td>
<td>the Chicagoland Area.</td>
</tr>
<tr>
<td></td>
<td>Cost: $75 per player</td>
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<tr>
<td>September 26, 2019</td>
<td>Dinner, Bowling &amp; Bocce Ball at Pinstripes Oak Brook</td>
</tr>
<tr>
<td></td>
<td>Sign up while registering online for #itsmw19.</td>
</tr>
<tr>
<td></td>
<td>Pinstripes is just over 10 minutes from the</td>
</tr>
<tr>
<td></td>
<td>conference hotel.</td>
</tr>
<tr>
<td></td>
<td>Cost: $50 per person</td>
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</tbody>
</table>

**Technical Tour**

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
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</thead>
<tbody>
<tr>
<td>September 27, 2019</td>
<td>Behind the Scenes tour at O'Hare International Airport</td>
</tr>
<tr>
<td></td>
<td>Chicago</td>
</tr>
<tr>
<td></td>
<td>Sign up while registering online for #itsmw19 by Aug. 23rd.</td>
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<tr>
<td></td>
<td>Tour includes a bus tour around the O'Hare grounds,</td>
</tr>
<tr>
<td></td>
<td>with stops showing behind the scenes logistics.</td>
</tr>
<tr>
<td></td>
<td>Cost: free</td>
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**Exhibitors:**

- **SPACE AVAILABILITY**
  - **11** Standard Spaces out of 32
  - **4** Private Spaces out of 4
  - **0** Premium Spaces out of 6 **SOLD OUT**

Don't miss this fantastic opportunity to advertise and reach out to an extended audience of ITS professionals and experts. We still have space available, book yours now! Details at www.itsmidwest.org/2019-Annual-Meeting/exhibitors/

For details and updated information about “Midwest Connections : Travel Smart”:
www.itsmidwest.org/2019-Annual-Meeting/

See you this fall in Illinois!
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Northrop Grumman
Parsons
Q-Free (Open Roads Consulting)
SES America (SESA)
TPACO, Inc
TEC Engineering
The Ohio Department of Transportation
TMS Engineers
Total Traffic & Weather Network
Traffic Control Corporation
Traffic Control Specialists
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