

# ITS Midwest NEWSLETTER

Illinois, Indiana, Kentucky and Ohio

[www.itsmidwest.org](http://www.itsmidwest.org)

## President's Message

David Zavatiero

I'd like to take the opportunity in this President's Message to report on the "State of the Chapter." 2015 was a great year of accomplishment for our chapter culminating in an extremely successful Twentieth Anniversary Annual Meeting held in October in Oak Brook, Illinois, just outside of Chicago. The theme of the conference was "Connected Vision 20/20" to promote both the twentieth anniversary of the chapter and the future of automated and driverless vehicles operating in a connected world. I want to thank the organizers, sponsors, speakers, exhibitors, and participants for making the event, an

outstanding success. For those who were there and for those who missed the event information and photos from the Annual Meeting are posted at [www.itsmidwest.org](http://www.itsmidwest.org). Take a look, I hope it encourages you to attend our 2016 Annual Meeting September 22-23 in Louisville, KY, which is shaping up as another outstanding event for our chapter. Keep an eye on our website for breaking information on the 2016 Annual Meeting.

From its formation in 1995, ITS Midwest has been a multi-state chapter of ITS America. Originally, ITS Midwest covered the states of Illinois, Indiana, and Wisconsin. In 2007, ITS Midwest merged with ITS Mid-America and now covers the states of Illinois, Indiana, Kentucky, and Ohio. As a four state chapter, ITS Midwest has sought to maintain and grow as a diverse, volunteer, professional organization.

ITS Midwest is governed by a sixteen member Board of Directors comprised of a President, Secretary/President-Elect, Treasurer, as well as a Vice President and two Directors from each of our member states, and our immediate Past President. Officers are elected on a rotating basis each year, and Directors are elected annually. Alternating regular monthly meetings of the Board and Executive Committee are conducted via teleconference. Meeting notes are available to all ITS Midwest members through postings on the ITS Midwest Website.

Several Board positions will be open in 2017 with nominations and the election vote held just prior to the 2016 Annual Meeting. As a member, you are invited to consider running for one of the open

positions. ITS Midwest is most successful when more members are actively involved in the planning, implementation, and operation of chapter activities.

Our solid finances have allowed ITS Midwest to plan for and support a variety of activities on its own and in coordination with other professional organizations involved with transportation issues and projects in the four state region. Over the past year, in addition to the Twentieth Anniversary Annual Meeting, ITS Midwest has held and co-hosted events with the Institute of Transportation Engineers, the Ohio Transportation Engineering Conference, the Purdue Road Safety School, the Lake Michigan Interstate Gateway Alliance, and the Great Lakes Regional Transportation Operations Coalition, among others. We continue to look for mutually beneficial partnerships to advance intelligent transportation technologies.

The activities of ITS Midwest have been

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David Zavatiero, President of ITS Midwest

developed and supported by several Committees including: Member Services - responsible for maintaining member records and expanding membership; Finance - responsible for the treasury, receiving and dispersing funds; Outreach/Communications - responsible for the ITS Midwest Newsletter (with the current issue posted on [www.itsmidwest.org](http://www.itsmidwest.org) for the general public and archived newsletters available on the members only page of the website); Recognition - responsible for Chapter Service and Project of the Year awards; Training - responsible for technical workshops and webinars; Technical - responsible for the technical programs offered by the chapter; and Meetings - responsible for the planning and logistics associated with chapter events. Let me

know if you would like to help on a Committee. Your ideas and participation are always needed and greatly appreciated.

ITS Midwest continues to use several methods to share information with our members and with the larger transportation community. Chief among these are the ITS Midwest Newsletter and the ITS Midwest website. A Member Spotlight featuring a significant project or initiative by a member organization is a key feature of each newsletter. Blast e-mails are also periodically sent to all members to inform them of significant upcoming events, training sessions, webinars, important technical articles, and legislative issues of interest to the technology community.

Finally, ITS Midwest has been a regular participant on the ITS America State Chapters Council and with ITS America activities and conferences that further the overall mission of the ITS Community to promote and achieve national and local, inter-operable deployment of ITS.

ITS Midwest and our members have benefitted greatly from our affiliation with ITS America both in terms of technical and informational enrichment and in terms of collaboration and networking. We look forward to a sustained partnership and are committed to assisting ITS America and our membership as we pursue the Roadmap for intelligent transportation systems implementation and deployment.

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## Illinois Department of Transportation Actions Improving Real-time Traveler Information

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### Background

Researchers recently completed a two-phase study for the Illinois Department of Transportation (IDOT) with the objective of providing guidance on enhancing real-time traveler information practices to comply with the requirements of 23 CFR 511. This regulation required state departments of transportation and other transportation agencies to establish real-time systems management information programs by 2014. The purpose of these programs was to collect, disseminate, and assess the quality of real-time traveler information. Specifically, four types of traveler information are required: (1) travel times, (2) lane closures due to traffic incidents, (3) lane or road-closing construction activities, and (4) road weather conditions. To identify the quality of these types of information,

IDOT worked with researchers during the spring and summer of 2015 to measure their accuracy, availability, and timeliness. This article aims to summarize IDOT's recent activities measuring and improving the accuracy of these types of traveler information.

### Traveler Information Activities

The researchers first considered the accuracy of travel times along IDOT facilities in the two largest metropolitan areas in Illinois. Compliance only requires transportation agencies to provide travel times along interstates in cities with populations of one million or more; therefore, researchers focused on the Chicago and St. Louis (the Illinois portion) metropolitan areas. The researchers found that the travel-time information accuracy in the Chicago area was better than the 85

percent accuracy threshold and the exercise helped identify road segments where improvements and expansions should be made (see Figure 1). During this study, the travel time system for the East St. Louis interstates suffered a catastrophic failure and was not available for such a review.

Next, the research team measured the accuracy of traveler information related to traffic incidents occurring on IDOT interstates. Based on the existing flow of incident information within IDOT, the agency's central office had a database containing the information required for this review. The researchers verified that each incident had a reported start time, the level of closure (partial or full), the road segment, and a reported end time (clearance time).

Illinois has large sections of rural farmland separating its metropolitan areas.



Figure 1: Travel Time Information Accuracy and Availability (Fries, et al. 2016)

During the study, IDOT Districts managing roadways in rural areas did not operate 24-hours a day, except during winter storms. To aid real-time incident communication outside of the normal business hours of rural Districts, researchers worked with IDOT to craft a plan. In essence, the plan establishes communication responsibilities between Districts that operate 24-7 and those that do not. These responsibilities were divided to keep reporting consistent along interstate corridors and within State Police Districts.

The review of incident information reporting suggested the accuracy was better than the required 85 percent and that any sources of reporting errors came primarily at the start and end of incidents. Based on these and other findings, IDOT is making revisions to their Joint Operational Policy Statement with the Illinois State Police (ISP) to facilitate the flow of information about traffic incidents that close lanes on interstates. The previous version of the policy did not require ISP to inform IDOT of certain crashes unless infrastructure damage occurred, such as guard rails as shown in Figure 2.

	IDOT Corridor and Facility Limits
Chicago	US-20 (Lake Street) from Shales Parkway to IL-390 (Elgin–O’Hare Expressway)
	IL-83 from I-90 (Jane Addams Memorial Tollway) to 63rd Street
	US-41 (Lake Shore Drive) from Hollywood Avenue to 63rd Street
	IL-53 Expressway from Lake Cook Road to I-90 (Jane Addams Memorial Tollway)
	IL-390 (Elgin–O’Hare Expressway) from US-20 to I-290 (Eisenhower Expressway)
East St. Louis	IL-255: between I-270 and IL-143
	IL-15: between I-255 and IL-159

Table 1: Selected Routes of Significance in Illinois (Fries, et al. 2016)

Similarly, researchers measured the accuracy of traveler information related to lane or road-closing construction activities on IDOT interstates. During peak construction months, in the spring and summer of 2015, researchers reviewed a sample of 25 percent of these projects. The findings suggested that some Districts’ construction personnel and contractors were not aware of the need to report lane-closures in real-time. To resolve these issues, IDOT is implementing study recommendations to their Standard Specifications for Road and Bridge Construction and training personnel about the requirements for real-time information reporting.

Additionally, the accuracy, availability, and coverage of IDOT weather information was investigated. Two winter storm events were randomly chosen for review. Each storm was broken into time intervals and compared to weather conditions

from a trusted baseline source. Because of limited archived data, strong conclusions were not possible; yet, the review suggested that start and end times of storms might be key sources of errors.

Last, the researchers organized and facilitated stakeholder meetings to guide the selection of the most important non-interstate routes, defined as routes of significance by 23 CFR 511. Separate meetings were held for the Chicago and East St. Louis metropolitan areas, but the process was the same for each. IDOT planners, engineers, and other stakeholders discussed and rated factors that could make a route important/significant then identified a list of potential routes to consider. Factors selected were traffic volume, truck volume, facility level-of-access, frequency of congestion, and safety; albeit their importance was considered differently in each metropolitan area. Next, the researchers



Figure 2: Incident on Illinois Interstate.

collected data about each potential route and applied a multi-criterial analysis to rank them. The stakeholders reviewed the rankings and selected the final routes of significance, shown previously in Table 1.

### Closing Thoughts

In response to the traveler information re-

quirements of 23 CFR 511, IDOT has initiated a plethora of changes, including upgrades and expansions of infrastructure, improvements in training, updates to policy documents, and increases in data archiving. The underlying research study has helped IDOT identify which practices were already meeting requirements and which require further work. Lastly,

this study helped IDOT personnel identify goals to strive towards for real-time reporting of each type of information. These improvements have the potential to significantly improve traveler information along IDOT's interstates and routes of significance.

## Illinois Tollway Opens First All-Electronic Roadway

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Illinois Tollway

The Illinois Tollway opened its first all-electronic roadway on July 5, ushering in a ground-breaking method of collecting tolls on the Tollway system in Northern Illinois.

Cashless tolling began July 5, 2016, on a segment of the new Illinois Route 390 Tollway, located just west of O'Hare International Airport.

It provides Tollway customers a safer, more convenient and cost-effective way to pay tolls while enabling the Tollway to reduce construction costs by building on a smaller footprint and improve operational efficiencies by going cashless.

### About the Illinois Route 390 Tollway Project

The Illinois Route 390 Tollway is the east-west portion of the \$3.4 billion Elgin O'Hare Western Access Project, which is included in the Illinois Tollway's 15-year, \$12 billion capital program, Move Illinois: The Illinois Tollway Driving the Future, and includes 17 miles of new roads and 15 new or improved interchanges.

The Elgin O'Hare Western Access Project also includes building a new north-south



A new Dynamic Message Sign provides valuable traveler information along Illinois Route 390.

roadway around the western border of O'Hare linking the Jane Addams Memorial Tollway (I-90) and the Tri-State Tollway (I-294).

In 2015, the Tollway completed improvements to the western segment of the Illinois Route 390 Tollway between Lake Street and Rohlwing Road, where tolling began July 5. In 2016, the project includes

work to build the new Illinois Route 390 Tollway east from I-290 to Illinois Route 83. The project is scheduled to be complete by 2017, at which time tolling will begin on that segment, as well.

The Illinois Route 390 Tollway from Lake Street to Illinois Route 83, including a new interchange at I-290, is estimated to cost \$780 million.

## Popularity of cashless tolling

Cashless tolling is an outgrowth of the success Illinois and the nation have had with electronic tolling. It provides all customers – residents, businesses and visitors – with continuous travel at highway speeds throughout the Tollway.

In a recent survey throughout the area, more than 90 percent of drivers currently traveling along the Illinois Route 390 Tollway corridor have and use I-PASS. Of those without I-PASS, nearly one-quarter indicated that they would obtain one to use the new roadway once it opens.

The Illinois Tollway's tolling system boasts the highest percentage of electronic toll collection in the nation among tolling systems that support both cash and electronic toll collection, with more than 2.3 million daily toll transactions. More than 87 percent of all toll transactions are paid electronically through I-PASS or E-ZPass.

## How it works

The new Illinois Route 390 Tollway utilizes the newest technologies in the industry to electronically collect tolls. Toll collection equipment over the traffic lanes reads the I-PASS transponder on the windshield and automatically collects tolls. Drivers continue at normal speeds without the need to slow down or stop to pay at a toll plaza.

One of the unique features of the new tollway is that the toll collection points are located closer together. This allows for greater sensitivity for shorter trips and helps local communities provide congestion relief on adjacent roads. It also means tolls can be lower on the Illinois Route 390 Tollway because they are assessed more frequently than other parts of the system. Altogether, all-electronic tolling gantries will be installed at six locations along the 10-mile tollway mainline and on one of the entrance ramps.

Tolls for passenger vehicles range from 20 cents to 60 cents per transaction for I-PASS customers, who benefit from a 50 percent discount on tolls. Passenger vehicles traveling the full length of Illinois

Route 390 when completed in 2017 will pay \$1.90, similar to the I-PASS toll paid to travel on the Veterans Memorial Tollway (I-355) south extension between I-55 and I-80.

Commercial vehicles with I-PASS will receive a 33 percent discount for toll payments on Illinois Route 390, as well as an additional discount for travel during the overnight hours. Through trips for commercial vehicles will range from 39 cents per mile for small trucks to \$1.03 per mile for large trucks over the 10-mile trip, with individual tolls ranging from 40 cents to \$3.10 per transaction for trucks with I-PASS. Trucks traveling the full length of the Illinois Route 390 Tollway will pay tolls ranging from \$3.80 for small trucks to \$10.15 for large trucks, similar to the I-PASS per mile toll rate on the south extension of I-355 between I-55 and I-80.

Since there are no toll booths or cash baskets available along the Illinois Route 390 Tollway, all customers are driving on an I-PASS Tollway. Drivers with unpaid tolls can pay online or by mail within a 7-day grace period. However, for the month of July, drivers with unpaid tolls were given an extended grace period to pay until July 31, 2016. After this date, the 7-day grace period will resume.

## Rates and Schedule

Tolling on the western segment of the Illinois Route 390 Tollway began on July 5, 2016. The eastern portion is scheduled to open and tolling will begin by the end of 2017.



Illinois Route 390 Toll Rates and Schedule.

Benefits of the Illinois Route 390 Tollway include:

- **Savings** – Save money on tolls using I-PASS (50 percent off), reduce fuel consumption by eliminating stop-and-go driving and save money on gas
- **Convenience** – Eliminate the need to make a decision at toll collection point
- **Safety** – Don't need to slow down, change lanes or stop to pay
- **Environment** – Traffic noise and emissions are reduced through elimination of stopping at intersections



#SMARTCOLUMBUS

## “The Columbus Way”

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### BACKGROUND

On June 23, 2016, after a rigorous six-month application process, Secretary Anthony Foxx announced the City of Columbus as the winner of the US Department of Transportation (USDOT) Smart City Challenge. This came with a \$40 million grant from USDOT and a \$10 million grant from Paul Allen’s Vulcan, Inc. Seventy-eight cities competed in the challenge. The seven finalists were Austin, TX; Columbus, OH; Denver, CO; Kansas City, MO.; Pittsburgh, PA; Portland, OR.; and San Francisco, CA.

Columbus leveraged an unprecedented culture of collaboration, coined “The Columbus Way” by Harvard Business Review, to generate matching funds of more than \$90 million for the Smart City program, dubbed “Smart Columbus.” By knocking down silos and building up partnerships, Columbus has quickly become one of the fastest growing cities in the country, leading the Midwest in job and wage growth.

This article provides a brief summary of many of the technical deployments planned as part of the four-year USDOT Smart City grant. Much of the first year will be spent in detailed planning and design. Deployments will primarily take place in the second and third years. The fourth year will be focused on data collection, analysis, and operations and maintenance.

### A TALE OF TWO CITIES

While Columbus is a city of great opportunity, there are also still challenges. Like many cities, Columbus wrestles with an aging infrastructure while striving to satisfy growing demands for improved quality of life. Every family in every neighborhood should be able to share in the Columbus success story, but currently not every family does. The infant mortality rate is widely viewed as the global standard for measuring the health of a community. In the Linden neighborhood of Columbus, a neighborhood northeast of Downtown that has challenges with low-income and high unemployment, the rate is about four times higher than the national average. Absence of reliable access to prenatal care and challenging social and economic conditions are key contributors to the rate. Columbus’ goal is to reduce infant mortality in Franklin County by 40 percent and cut the racial health disparity gap in half by 2020. Through the smart corridors and smart payment projects to improve mobility, Smart Columbus will improve access to pre-natal care and provide ladders of opportunity for residents to address these challenging social and economic conditions.

### SMART COLUMBUS GOALS

After engaging residents, leaders, experts

and others, five major goals emerged to provide ladders of opportunity for all:

- Improve **access to jobs** through expanded mobility options in major job centers
- Enhance visitor experience by better **connecting our visitors** to transportation options
- Stimulate regional economic prosperity and compete globally through **smart logistics**
- Better **connect Columbus residents** to safe, reliable transportation that can be accessed by all
- Support the efficient movement of people and goods through **environmentally sustainable practices**
- Stimulate regional economic prosperity and compete globally through smart logistics

### IMPLEMENTING SMART COLUMBUS

The Smart Columbus enabling technologies will build the foundational elements of a smart city – a connected transportation network, an integrated data exchange (IDE) network, systems to support enhanced human services (EHS), and infrastructure elements to support smart grid and vehicle electrification solutions. These foundational elements will be applied to meet urban challenges that are faced by most cities, defined by neighborhoods and districts – residen-

VISION

ACCESS TO JOBS

SMART LOGISTICS

CONNECTED RESIDENTS

CONNECTED VISITORS

SUSTAINABLE TRANSPORTATION



Figure 1: The four core-enabling systems support the Smart Columbus vision and lay the foundation for deployment and repeatable implementation of smart solutions.

tial, commercial, downtown, and logistics – to deliver the outcomes desired by the USDOT. Figure 1 depicts how the Smart Columbus vision elements remain guideposts to the Smart Columbus program.

To tackle the challenges faced by our community, the Smart Columbus Program creates a menu of smart solutions built upon four core-enabling technologies:

The **Connected Columbus Transportation Network (CCTN)** will include traffic signals equipped with traffic detection and sensors, dedicated short range communications (DSRC), and pedestrian detection; truck loading zones with machine vision detection of zone availability; multi-function kiosks with transit service information, first/last mile and bike/vehicle sharing information, parking availability, and Wi-Fi hot spots.

The **Integrated Data Exchange (IDE)** open data environment will contain data from many different sources consistent with the USDOT’s Research Data Exchange (RDE) concept. IDE will generate performance metrics for program monitoring and evaluation; transparently serve the needs of public agencies, researchers, and entrepreneurs; provide practical guidance and lessons learned to other potential deployment sites; and assist health and human service organizations to provide more effective services to their clients.

A suite of applications and processes will deliver **Enhanced Human Services (EHS)** to residents and visitors. These applications include a multi-modal trip planning application, a common payment system for all transportation modes, a smartphone application for assistance to persons with disabilities, and integration of travel options at key locations for visitors.



Smart Columbus will expand the smart grid program and increase **Electric Vehicle (EV) Infrastructure**. We will install vehicle-to-grid capability for charging stations to manage grid resources, provide assistance and analysis to fleet operators to encourage EV adoption, increase investment in EV charging, create customer education programs such as ride-and-drive events with local dealers, and create an EV cooperative buying program.

### DISTRICT DEPLOYMENTS

Smart Columbus is taking a district-oriented approach to demonstrating how connected technologies can enhance mobility and improve lives. Four deployment districts were identified based on the unique proving ground they offer for nationwide scalability. The districts are: Residential (Linden) – high opportunity and economic need neighborhood Commercial (Easton) – high traffic retail

destination and jobs center  
Downtown – regional economic anchor and growing urban core  
Logistics (Rickenbacker) – Tenth most active logistics hub in the heart of America

## Residential District

### Challenges

The Linden neighborhood was chosen as the first neighborhood district for its numerous socio-economic challenges, including low household income, a lack of major employers, and poor access to recreational amenities. Decades ago, the construction of Interstate 71 along the west border of the neighborhood cut Linden off from nearby amenities, services, and centers of employment. These problems are compounded by the lack of access to transportation options. Despite the neighborhood's proximity to the central core of the Columbus region, basic services such as healthcare, grocery stores, and banking are scarce within the neighborhood boundaries. Many residents are transit-reliant; yet planning and completing a trip to access employment and services can be challenging, particularly for parents with young children, seniors, and travelers with disabilities.

Transit service is available in Linden along the Cleveland Avenue Corridor; however, facilities at bus stops are lacking, with few shelters along existing bus routes. Intersections in the area are frequently ranked as unsafe, with three of the top 25 highest crash intersections in the Columbus Region located in Linden. Neighborhood residents report that existing shelters are often poorly lit and lack amenities. There are also many First Mile/Last Mile (FMLM) challenges along the corridor: sidewalks are missing from many streets and the existing network is in poor condition; street lighting is often dim or missing; and, Americans with Disabilities Act (ADA) compliant facilities for travelers with disabilities are often inadequate or non-existent.

Due to the lack of major employers in

Linden, residents must travel to other neighborhoods to seek employment. Commuting can be a challenge, particularly for carless households. Currently, planning and completing a trip to work is difficult when multiple modes or systems are involved. Departure, arrival, and overall travel times can be unpredictable if congestion is present in the system. This unpredictability can place stress on residents who work shift-based schedules.

Numerous public health issues exist in Linden, where residents often lack access to basic healthcare facilities and health insurance. One clear manifestation of this problem is infant mortality – for every 1,000 babies born in the United States, about six die before the age of one. In South Linden, this number is nearly four times higher. Infant mortality is especially acute for black babies, who, in Franklin County, are two and a half times more likely to die before their first birthday than white babies. Currently, there are no obstetrics/gynecology offices in Linden to combat this problem. Seventy-five percent of WIC (Women, Infants and Children) recipients are in need of transportation to and from their appointments.

The neighborhood is also a food desert without easy access to a major grocery store with fresh produce. Many residents report that their main sources of food are convenience stores. In addition, exercise and recreation are possible at nearby parks and trails, but accessing these facilities can be difficult. Underserved communities throughout the United States unfortunately share many of the same challenges. By deploying smart technology solutions in Linden, Smart Columbus will demonstrate how next generation transportation technology can reconnect neighborhoods previously divided by transportation infrastructure.

### Technology Solution

The Smart Columbus deployment proposes to address the transportation challenges of Linden using a multi-faceted, scalable, high-technology approach that



Figure 2: Residential District.

includes the following core components:

- **Smart Corridor** will leverage the new Central Ohio Transit Authority Bus Rapid Transit Project Brand (COTA CMAX BRT) line by installing DSRC-equipped intersections along Cleveland Avenue and neighboring streets, including Hudson Street, High Street, and Morse Road.
- **New Mobility and Safety Applications** will be enabled through the Smart Corridor infrastructure and demonstration deployment of 3,000 Connected Vehicles (CVs) throughout the City. Applications will be provided via a combination of in-vehicle signage, mobile apps, and on-street kiosks.
- **Neighborhood Hubs** (serving the Smart Corridor) will provide a variety of transportation options to facilitate FMLM connections, as well as access to the jobs and amenities that were cut off by the construction of Interstate 71.
- **Smart Lighting and Wi-Fi Infra-**



structure will be deployed in part of the neighborhood to provide FMLM safety and to make the neighborhood more walkable.

## Commercial District

### Challenges

Located in northeast Columbus, the Easton area is a mixed-use environment consisting of retail space, dining, commercial office space, warehousing, and residential units accessed primarily by light-duty vehicles with regular scheduled bus service along the fringes of the area. The central retail area is built in the model of a mid-20th century urban town center, including through streets designed for vehicular traffic and on-street parking. With the exception of an enclosed mall structure comprising a small portion of this retail space, the majority of stores and restaurants have direct off-street access, resulting in a high percentage of pedestrians along outdoor sidewalks interacting with vehicular traffic. Surrounding this central region are several strip malls, big-box retailers, and stand-alone dining areas. To the south are large office and apartment/condominium complexes. This mix of properties has resulted in an extremely dense population of both people and vehicles. There is 2.9 million square feet of office space and 1.7 million square feet of retail space in the area. At its daily peak, as many as 32,000 people and 400,000 vehicles/week might be located in the region, and the number of jobs in the area exceeds 30,000.

The area serves as a major employment center, with numerous jobs in the retail, food services, and warehouse industries. These jobs are typically low paying and have a high-rate of turnover. Further, research has demonstrated that a major contributor to the instability in these types of jobs is the lack of reliable transportation. Compounding this challenge is a high number of professional service industries, such as legal, finance, and insurance, including regional or national headquarters, that are also located in the

region.

While the area is served by both public transit services and numerous parking facilities, the proximity of these stops and/or facilities to the final destination of travelers, combined with the density of both pedestrian and vehicle traffic, creates both safety and mobility concerns. After departing transit, there remain points within this region that literally approach a mile distance from the current stops, presenting a FMLM challenge and potentially discouraging transit use in the region, both for employees and for patrons. Those who travel using their personal vehicle add to the congestion and find similar FMLM challenges due full parking lots.

Finally, there is the need to reduce harmful emissions and the sources of those emissions. Current traffic volumes in the area, particularly during peak times, have necessitated consideration of capacity improvements as costly and expansive as adding an additional freeway exit to support the present volume. Future development plans include additional retail and office space, furthering the current congestion challenges and demands on the transportation system.

### Technology Solution

Addressing the challenges of the commercial district requires both investment in technology solutions and techniques to create societal change. The Smart Columbus approach offers a safe, efficient, accessible, environmentally friendly and easily expandable FMLM transportation solution by deploying a fleet of multi-passenger electronic autonomous vehicles (EAVs) that leverage the enhanced connectivity provided by the CCTN and the citywide travel planning and payment solutions. The FMLM solution also extends access to jobs by expanding the reach of the new CMAX BRT system to the west and deploying smart connected intersections throughout the region, allowing for more efficient traffic flow.

As Figure 3 illustrates, current electric au-



Figure 3: The commercial district includes EAVs in a mixed-use environment.

tonomous vehicle deployments would operate on three fixed routes, with EAV deployment dependent on the time of day and the day of the week. These routes will serve the retail, commercial, and warehouse centers in the region, and create a connection to the recently opened, high-volume transit center located in in the Easton area, as well as to the numerous parking areas in the region.

The envisioned EAV fleet would utilize existing public roadways that will be “upgraded” to ensure necessary lane-keeping and safe traversing of intersections. The fleet would also use inductive charging stations to allow for fully autonomous operations, only requiring human interaction for regular safety and maintenance inspections, or if a system error occurs. Finally, the “station” that will house this fleet during off hours and when recharging will be fully equipped with photovoltaic (solar) panels, and will be integrated with an expanded Smart Grid to allow for optimal charging cycles to be considered as part of the fleet’s operations.

The proposed EAV will incorporate the latest electrified AV technologies available, but would include up to a 12-passenger vehicle, wheelchair capable, fully

autonomous, electric vehicle capable of speeds of up to 25 mph.

The city intends to deploy six EAVs in the district. Two proposed work center shuttle routes will be synchronized with the schedules of the local employers and the COTA fleet, and will start and end at the COTA Transit Center. The retail shuttle will operate within the confines of the retail area, serving the largest parking facilities and retail areas. Connection Protection, a feature of the Integrated Dynamic Transit Operations Dynamic Mobility Applications bundle, will be implemented to ensure successful transfers are made between COTA and the EAVs. Additionally, the EAV will be equipped with robust health and status monitoring capabilities, a sophisticated obstacle bypass algorithm, and for worse-case scenarios, can be operated locally and remotely.

## Downtown District

### Challenges

Columbus' vibrant and fast-growing economy is anchored by the region's downtown district, depicted in Figure 4. As the region's central business district and center of government for the State, County, and City, the district's workforce is just over 83,000. Its largest employers include the State of Ohio, Nationwide, Huntington Bancshares, and American Electric Power. Moreover, 32,000 college students attend one of the five higher education institutions located in the urban core.

The greatest challenge to continued growth and development of downtown is the lack of parking availability. The commercial office vacancy rate for all classes of space is 12 percent. Commercial real estate brokers report that they cannot lease office space because prospective tenants cannot find parking for employees. Hotels and other service industries report high staff turnover because of the cost of parking. Major employers report an inability to add jobs downtown. Visitors for events and guests of everyday

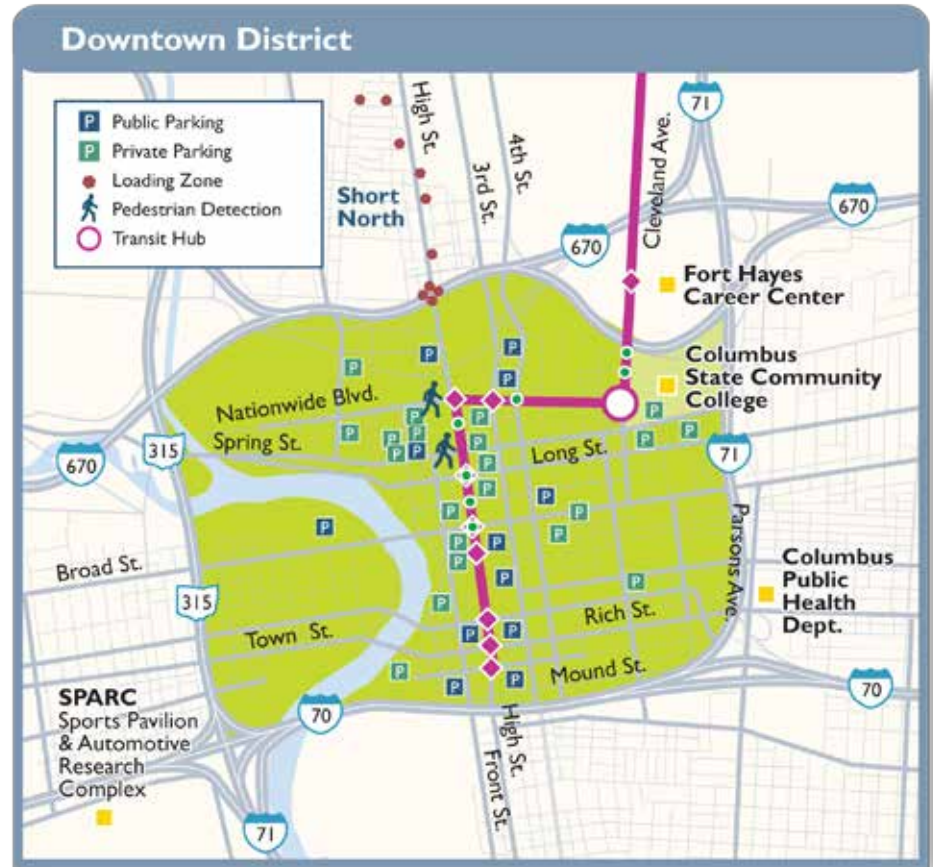


Figure 4: The downtown district solution leverages multiple technologies to address a range of challenges.

business activity report regular frustration with finding parking. Additionally, increased congestion and roadway blockages result from delivery or service vehicles double-parking or continuously circling a block because of a shortage of delivery parking spaces to service restaurants, shops, and hotels.

### Technology Solution

These proposed technology solutions leverage the enabling technologies, particularly the EHS multi-modal trip planning application, the CCTN expansion to include video monitoring of loading zones in the downtown district, and the IDE. The following provides additional information on the specific deployment.

**Event Parking Management.** The City of Columbus has partnered with Experience Columbus and their associated agencies who collectively manage more than

42,000 parking spaces in Downtown Columbus. Together, with the City's roughly 4,200 managed metered parking spaces, these providers encompass virtually all publically available parking in the downtown district and the Short North neighborhood. Each of these parking providers already utilizes a variety of different technologies and tools to determine the availability of parking in their facilities. For example, the City's parking meters are all connected via a cellular backhaul and can provide information on their payment status in real-time. In partnership with the City, these operators have agreed to provide real-time availability of public parking in their facilities as an electronic input stream to the IDE for the duration of the Smart Columbus Program and beyond. This information will then be utilized by the City's potential partnership with HERE, Inc. for a multi-lingual, multi-modal trip planning application that will provide this information to

the traveling public in real-time. Linkages to the reservation pages of the respective parking providers will be included, allowing travelers to both plan and “reserve and book” a parking space during large events. Direct routing of travelers during large events is expected to reduce the overall congestion during those events. In addition to other forms of payment, each of these providers would accept the Smart Columbus payment card at their facility/meter for their parking.

**Loading Zone Parking Management.** As discussed in the build out of the CCTN, we will include video equipment that will be capable of monitoring loading zones in the downtown district and programmatically determine availability using objective detection and visual data processing algorithms. The City has partnered with Truck Smart Parking Services, Inc. (TSPS) and HERE, Inc. to install and operate a real-time parking availability service for freight delivery. We will identify 10 loading zones at locations in collaboration with special improvement districts and property owners and businesses within the downtown district during the first year, install a reservation service during the second year, and operate this reservation service for the remaining years.

**Managing Permit-Only Parking Spaces.** The City of Columbus issues 6,300 color-coded parking permits annually. We will pilot and evaluate augmenting the usefulness of these simple windshield stickers with a customized RFID-based window sticker provided by partners NXP and Neology. Through the inclusion of RFID technology in these window stickers, the City could almost immediately create a large pool of technology-enhanced vehicles where the technology includes relevant information such as vehicle identification. The large number of stickers offered by Neology could allow the City to potentially extend the demonstration to other permit parking zones in the City. Coupled with Ultra-High Frequency (UHF) RFID readers placed at strategic points, such as at surface lots and at the borders of permit parking zones,



Figure 5: The Columbus region serves as a gateway to the North American market. Source: Columbus 2020

these RFID stickers will enable the City to have information on the number of permitted vehicles within each permit-only parking zone as well as automating enforcement through the use of a mobile mounted UHF RFID readers.

**Transit Benefit Program.** The program aims to create a scalable, user-oriented transit benefit to shift the commuter culture of our workforce by increasing public transportation ridership and car sharing, and decreasing the demand for parking infrastructure and output of carbon emissions. The program will be deployed through an early adopter network of ten private-sector employers, property owners, civic organizations, and the City of Columbus. The deployment of this pass program within our member companies and partner organizations will invite integration of transit education within human resource operations and would open up information sharing funnels to input commuter behavior and transit usage from this program into the IDE.

### Logistics District

#### Challenges

The Columbus region ranks first among inland and coastal ports in population

concentration within a one-day drive. The region is intersected by eight major Interstate highways. The City of Columbus itself is within a 10-hour drive of 47 percent of the country, and serves as a hub for long-haul trucks. In addition to highway-borne freight, the City is served by both the Norfolk Southern Heartland Corridor and CSX Gateway that link the Columbus region to multiple deep water and East Coast ports.

Columbus experiences three significant freight-induced transportation challenges that will be addressed:

1. **Freight-induced congestion and queuing** is a significant challenge at the south end of the City where distribution centers have been established in proximity to Rickenbacker Airport.
2. **Major incidents involving heavy-duty vehicles at bridges and overpasses** occur relatively infrequently, but when they do occur, it results in significant costs.
3. **Accommodating long-distance freight haulers to achieve their hours-of-service requirements** without increasing congestion or wear-and-tear on local roads is another significant challenge facing the City. A significant number of

truck trips originate from the City as well as travel through the City to destinations within Ohio and throughout the Midwest. Long-haul trucks have been observed queuing on access and local roads as they wait for parking availability.

## Technology Solutions

**Driver Assistive Truck Platooning (DATP)** is the wireless coupling of longitudinal (brake and throttle) control of two trucks to maintain a safe, aerodynamic following distance between the trucks. On Alum Creek Drive, equipped tractor-trailers will platoon two-at-a-time. Their movements will be monitored and coordinated by the Peloton Network Operations Center (NOC) that will also take into account dynamic conditions such as traffic, work zones, and weather, using information feeds from the IDE to adjust gap sizes and other operating parameters for optimal safety and traffic flow. In approaching intersections equipped with Platoon Signal Priority (PSP) and DSRC I2V to broadcast signal phase and timing data, the trucks will adjust their speed to align with signal timing. In parallel, the signal controller will become aware of the approaching platoon via standard DSRC V2I communications and will seek to provide the trucks priority if conditions allow. The anticipated benefit for this deployment is that trucks will take up less precious space on arterial streets, the intersection becomes more efficient, and truck drivers save time and fuel. PSP and Freight Signal Prioritization (FSP) will be implemented along Alum Creek Drive and Williams Road using DSRC equipment on the trucks and installed at the signalized intersections.

**Minimizing incidents due to low bridges or narrow roads** will be completed through conducting a comprehensive inventory of all road overpasses within the City and making this information available to the public via the IDE. The City of Columbus has partnered with Truck Smart Parking Services (TSPS), Inc. to implement an intelligent truck warning and routing application.

## Major Logistics Employers in the Columbus Region

- Abercrombie & Fitch Co.
- Big Lots, Inc.
- Cardinal Health, Inc.
- DSW, Inc.
- Eddie Bauer
- Exel, Inc.
- Express, Inc.
- Zulily, Inc.
- FedEx Corporation
- L Brands, Inc.
- Restoration Hardware
- Target Brands, Inc.
- United Parcel Service, Inc.
- Wal-Mart Stores, Inc.
- Amazon

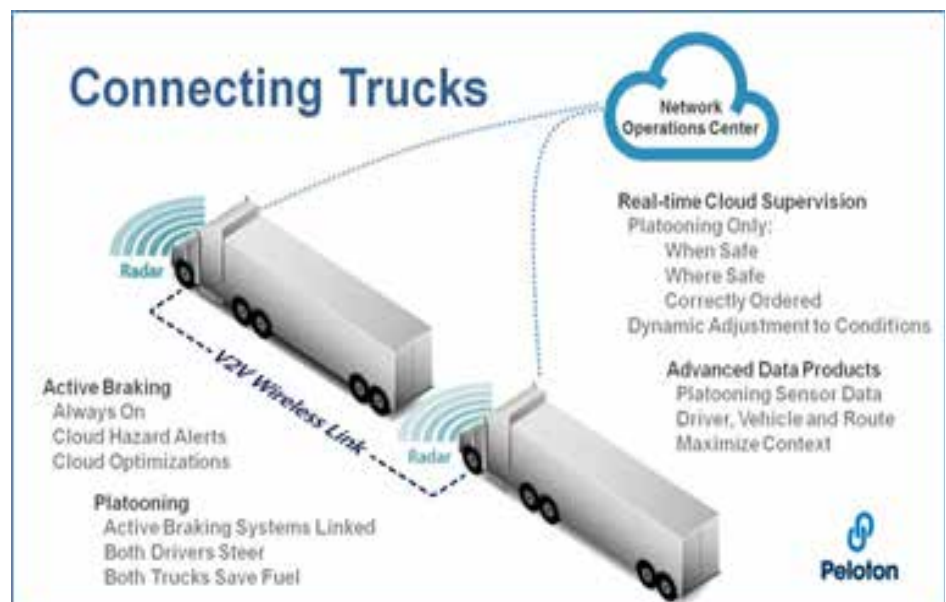


Figure 6: The City of Columbus may partner with Peloton to deploy two-truck platoons along Alum Creek Drive to reduce congestion and increase capacity.

**Regional truck parking information and management system** would leverage the \$25 million Secretary Foxx awarded in 2015 for the development of such a system across eight states, including Kansas, Indiana, Iowa, Kentucky, Michigan, Minnesota, Ohio, and Wisconsin. Ultimately, traditional and non-traditional parking providers within the Columbus region,

such as distribution centers or truck stops can register within the IDE and provide real-time availability on their parking. Truck operators will be presented with available parking options based upon criteria such as current location, availability of space and traveling distance from the highway.

## Pace ITS Initiatives to Support Regional Transit Systems Interoperability

Taqhi Mohammed, James Garner and David Tomzik  
Pace Suburban Bus Service

### Background

Pace Suburban Bus Service (Pace) has an extensive transit network spanning the six-county Northeastern Illinois area, including suburban Cook, DuPage, Will, Kane, McHenry and Lake Counties. Pace operates 200 fixed routes with more than 700 buses and other demand responsive services. The service area encompasses a population of more than 8.5 million people with an employment base of 5.2 million.

Pace in recent years launched two major ITS initiatives to support regional interoperability, i.e. Transit Signal Priority and Electronic Fare Payments.

### Transit Signal Priority System

Buses, unlike trains, operate in traffic and, as any of the millions of people who drive on the roadways in northeastern Illinois every day can attest, the traffic in this region causes delays, frustration and real economic costs to individuals and businesses. However, through federal investment, Pace will equip its fleet with special Transit Signal Priority (TSP) technology that allows buses to extend the desired green time, and shorten the competing red time at TSP equipped signalized intersections without any significant impact on general traffic.

Transit Signal Priority (TSP) facilitates the movement of transit vehicles through traffic-signal controlled intersections. When buses are behind schedule, special devices on the buses will communicate to the traffic-signal controlled intersections. The traffic signal control system will then provide the bus priority by extending the

desired green signal time, shortening a competing red signal time or providing queue jumps. TSP is a great benefit because it improves schedule adherence and can reduce bus travel times along busy arterial routes. The time savings, though small at each signalized intersection, can accumulate into a significant decrease in travel time over the course of the entire bus route.

### Regional Interoperability:

Expansion of TSP systems throughout the region is planned for the next five years through Federal Congestion Mitigation and Air Quality (CMAQ) Improvement Program funding. This funding will support a five-year program of TSP implementation along priority corridors for the benefit of strategic Pace bus routes in the region. The TSP program supports the CMAP GO TO 2040 goals, Pace's Vision 2020 and improves air quality.

In order to support regional coordination, the Regional Transportation Authority (RTA) is leading a comprehensive effort known as the Regional Transit Signal Priority Implementation Program (RTSPIP). The overall goal of the RTSPIP is to develop and implement a regionally-interoperable TSP System that would work for both CTA and Pace buses traveling through roadways maintained by the Illinois Department of Transportation (IDOT), the Chicago Department of Transportation (CDOT), County Departments of Transportation and others.

Pace has worked with the RTA to develop multiple documents that have described how a regionally interoperable TSP System should function for the Chicago re-

gion, including a Concept of Operations (ConOps), Technical System Requirements, Regional TSP Standards and Implementation Guidelines, and Verification Plan.

Among the key features of the regionally interoperable TSP System are a standard TSP Message Set based on NTCIP 1211, and the 5.0 GHz frequency and 802.11n Wi-Fi communications protocols to be used between buses and intersections. These standards will enable regional TSP interoperability between Pace and CTA buses and intersections throughout the region.

The TSP system is divided into three general areas of communication between system components:

1. Vehicle-to-Intersection (V-2-I): Represents equipment on-board Pace and CTA buses that communicates the TSP Message Set to intersection-based equipment. Pace plans to utilize the existing Trapeze Automatic Vehicle Locator (AVL) systems to generate the TSP Message Set based on NTCIP 1211 and communicate the information through Wi-Fi (802.11n) and 5.0 GHz radio on Pace buses to intersection equipment.
2. Intersection-to-Intersection (I-2-I): Represents equipment at intersections that can relay TSP requests to signal controllers and to other intersections as needed for the purpose of TSP operations. The intersection equipment will include a Priority Request Server (PRS), which will be responsible for receiving and processing the TSP Message Set, as well

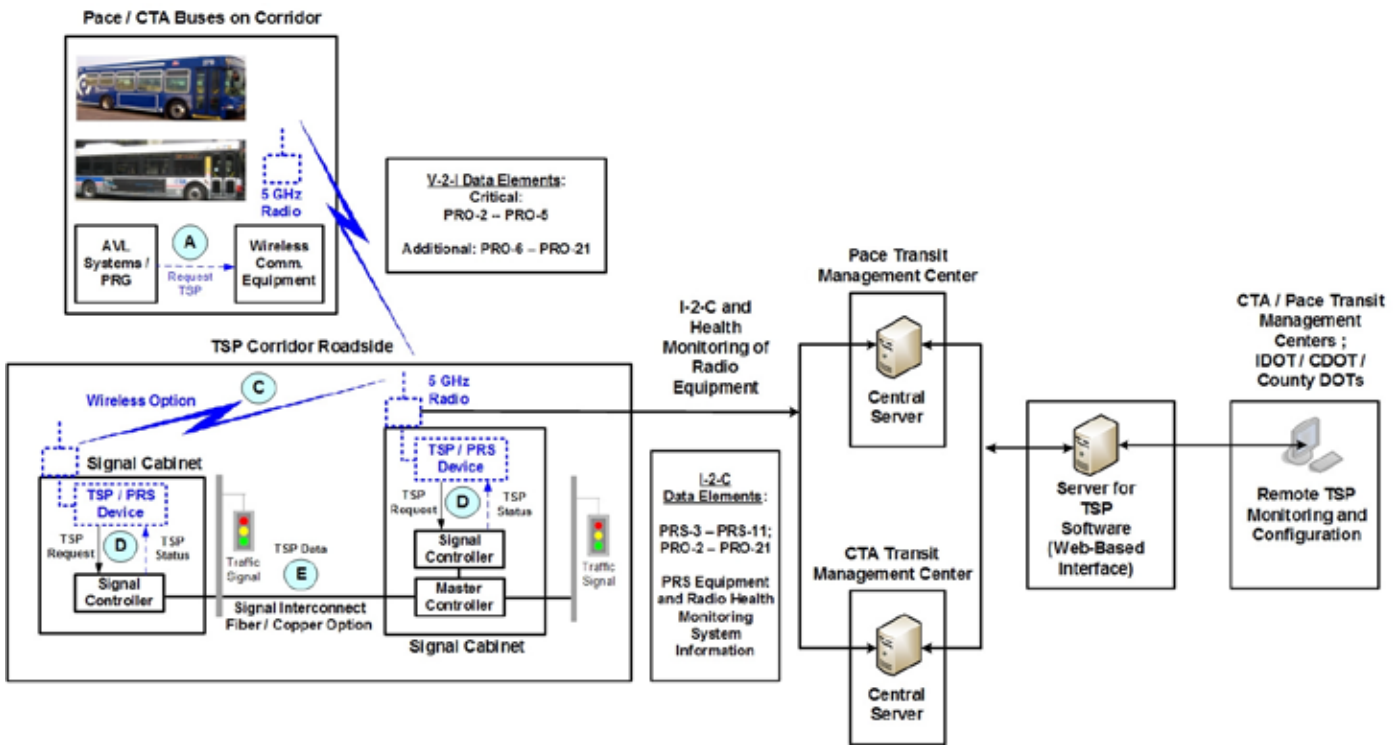


Figure 1: System Architecture of Regional TSP System.

as interfacing with the existing intersection’s traffic signal controller to relay the TSP request to the controller.

3. Intersection-to-Center (I-2-C): Represents the communications equipment that can relay operations data and logs from TSP equipment to Pace / CTA central offices for system administration purposes and potentially use a cloud based sever based on cost benefit analysis.

In the long-term, the proposed TSP system could migrate to a Centralized TSP System. In a Centralized TSP system, the TSP requests are communicated to the traffic signal control system through the Pace Transit Management Center. This will require an additional layer of communications between transit and traffic management centers.

**Priority Request Generator Development:**

Pace is working with Trapeze to implement the functions required to communicate the TSP Message Set based on NT-CIP 1211 through Wi-Fi (802.11n) and 5.0

GHz radios on Pace buses to intersection equipment. The existing in-vehicle AVL system will perform the Priority Request Generator (PRG) functions and use existing in-vehicle radio to communicate the message set to intersections.

**Priority Request Server Development:**

Pace is also working with Aegis ITS to develop a regional Priority Request Server (PRS) software to be embedded within Econolite Cobalt/ASC3 Controllers that will perform the PRS functions. The regional PRS will be responsible for receiving the TSP Message Set through a dedicated 5.0 GHz radio, as well as interfacing with the existing intersection’s traffic signal controller to relay the TSP request to the controller. This will eliminate need for additional TSP equipment within the Traffic Signal Controller Cabinet. CTA is working on a similar project for Peak ATC controllers. Simultaneously, Pace and RTA are working together to explore if other traffic controllers can be feasible for the above described software solution.

Currently, Pace is working on central soft-

ware acquisition for monitoring the TSP system and communication network. Also, Pace is working on procuring PRS equipment for intersections where controllers cannot be replaced.

Through the RTSPIP and other TSP related planning efforts, Pace has identified the following several corridors for TSP implementation with approximately 300 signalized intersections being selected for TSP. Pace and IDOT District 1 worked together to implement signal timing optimization along these TSP corridors and designed TSP timing strategies for selected TSP intersections.

1. Milwaukee Avenue
2. 95th Street
3. Cicero Avenue
4. Grand Avenue
5. Roosevelt Road
6. 159th Street
7. 147th St. / Sibley Blvd.
8. Dempster Street
9. Cermak Road
10. Halsted Street
11. I-90 Corridor Access Intersections

Pace plans to conduct a complete Proof-of-Concept (PoC) demonstration of the regionally interoperable TSP system along the Milwaukee Avenue corridor at a small number of intersections by mid-year 2017. PoC is to verify that the system meets program requirements prior to implementing the TSP system along the above listed corridors in the next two years.

## Pace Electronic Fare System

Pace joined forces with the CTA and Cubic Transportation Systems to create the Ventra account-based fare system in 2012. Implemented in stages over the course of one year, the system has now executed well over a billion transactions in its brief history. The system, the most advanced account-based system installed in the United States, has since brought Metra commuter rail into the fold, making it a true regional fare system.

An account-based system has all financial, customer, and account information saved on the “back-end,” the servers of the fare system. No data is stored on the card, except for a token identifying that card to the back-end. This provides more security to the customer—stolen cards can be instantly disabled and replaced, while the account information (including all balances and passes) is secure. In addition, this type of system allows for instantaneous reloads, updates, and purchases of passes from any type of retail outlet—ticket machine, retail location, internet, or mobile app. Previous systems could take up to 24-48 hours to add value to a smart card. This page includes a picture of the Mobile Validators (MV) and it is used to record the tap from the Ventra card. The Drivers Terminal (DT) is used to check balances on accounts and as a backup for forced logon situations. This also allows the drive to allow multi rides, and to perform reduced fare overrides.

Another advantage to this system is that fares and fare products can be updated simply by updating a table in the system itself, instead of the previous way of up-



Figure 2: Mobile Validator (MV) and Data Terminal (DT) Bench Set Up.

loading data into each and every farebox in the system (for Pace that's over 700 fareboxes). There have been several instances where it was determined that Pace needed to extend the expiration dates of certain passes and privileges. With the old system, this was impossible, operators would be told to just accept the pass visually and to manually record the trip. In Ventra, this is just a function of changing dates in a table, without having the operators or the customers make any changes.

Similarly, this system allows complex fare calculations, if necessary. It also allows Pace to drill down to provide special passes or privileges to a certain group of people. For example, Pace worked with the Village of Niles to re-route its free bus service, working to make the service reflect current travel patterns. As a consequence, it made operational sense to discontinue service over an area of light ridership that was already served by frequent service on a major Pace route. Pace worked with the village to identify the affected population, and then gave a special privilege to those affected that allowed them to ride the major route for free. Pace identifies these trips and bills the Village of Niles

for the lost fare revenue. This lost revenue is miniscule compared to the operational efficiencies attained. This solution was acceptable for the city, Pace, and the affected population, a solution not possible without Ventra.

In 2014, the Ventra team joined forces with Metra, the agency responsible for commuter rail in the region, to provide a mobile app for Android and Apple iOS devices that allows riders to purchase and use Metra tickets and passes. In addition, CTA and Pace riders can purchase passes and transit value that becomes immediately available on their Ventra cards. 40 million dollars in products for all agencies has been purchased from the mid-November launch of the app through April 27. In addition to purchases, app users can check the status of any bus or train (CTA or Metra) in the region as well as manage their Ventra accounts. Over 60,000 people now use the app on an average weekday.

Pace has used the introduction of Ventra to re-evaluate its data needs and its processes, as well as the way it handles data. The introduction of Ventra brought much more timely access to ridership data,

as well as data that are more accurate. What's more, most of the missing data can be found when comparing Ventra data to other Pace data sources, such as schedule adherence data from TransitMaster, our CAD/AVL (IBS) system. With Ventra, resources can be shifted from data cleaning and preparation to data analysis.

Pace works with three major datasets when providing data analysis to both internal and external customers. These sets, each containing millions of records per month, are as follows:

- Ventra Fare collection data with route, fare, and geographic information for each trip taken, approximately 2.6 million trips per month. This information does not contain any customer information, only a "token" that serves to distinguish individual cards (for privacy reasons).
- Trapeze TransitMaster schedule adherence data containing major operating information. This consists of roughly 1 million time point readings per month, plus smaller files with additional information.
- Automated passenger counter (APC) information from the 65% of the fleet with counters. We have a third-party system (RideCheck) that checks the raw TransitMaster data for correctness and consistency, with an end result of roughly 45% of our on/off information available.

Pace has many tools available for analyzing and communicating data, including:

- Database software (MS Access, SAP, Oracle, SQL) depending on the system and data storage
- ArcGIS
- Python and R for large databases
- MS Excel
- Tableau for visualization, currently testing Gephi for use with large and complex databases

The combination of these tools and datasets enable Pace's Research & Analysis group to provide a wide variety of infor-



Figure 3: Ventra Electronic Fare Card Mobile Validator mounted inside a Pace Bus.

mation and services to our planners and executives. Ventra now provides detailed information on boardings, and, especially, transfers and transfer locations. Pace can provide detail regarding to/from data that did not exist within the previous system. In addition, automation has enabled Pace to present a much more detailed picture of ridership in general.

Another data initiative is the move to interactive instead of ad-hoc reports using ArcGIS. Pace now provides ridership and other information online, and it's constantly updated to the latest data. Other on-going projects include using analytics

to efficiently assign buses based on capacity, visualizing schedule adherence by timepoint and block to visually identify problem areas, and developing customer-focused performance measures, such as customer-facing on-time performance.

Conclusion: Pace is committed to deploying innovative technologies to improve transit system efficiency and ease in use for its customers through various ITS initiatives and support regional transit systems interoperability as demonstrated with above described Transit Signal Priority and Integrated Electronic Fare Payments programs.

## Contact:

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## Northrop Grumman Sponsors Annual Kentucky Lifesavers Conference

Scott Evans  
Northrop Grumman

From March 22 through March 24, the 2016 Kentucky Lifesavers Conference was held in Louisville, KY. The conference was hosted by the Kentucky Office of Highway Safety (KOHS), the Kentucky Transportation Cabinet (KYTC), the University of Kentucky Transportation Center (KTC), the National Highway Traffic Safety Administration (NHTSA), and the Federal Highway Administration (FHWA). The conference brought together over 400 transportation safety professionals from the local, state and national level along with 24 highway safety exhibitors. This is Kentucky's premier highway safety meeting which offers a great opportunity to network across the highway safety spectrum with participants from engineering, enforcement, education and emergency services in attendance. Twenty workshop sessions along with three general sessions were conducted during the conference. Northrop Grumman was a conference Silver Sponsor.

The opening session, presided over by Bill Bell, Executive Director of KOHS, included a welcome message from newly-elected Governor, Matt Bevin. The Governor was followed by Greg Thomas, Acting KYTC Secretary and Lt. Colonel Gregory Burns Jr., Assistant Chief of Police for the Louisville Metro Police Department (LMPD). The speakers included David Kim, Deputy FHWA Administrator; Dr. Beth Baker, NHTSA Region 3 Administrator; and Kendall Poole of KPoole Strategic Relations.

The general session on day-two contained a panel discussion on Highway Safety Matters that included Ronnie Day, Executive Director of the Kentucky Fire Commission; John Tilley, Secretary of the Kentucky Justice Cabinet; Pam Rice, Kentucky Division Administrator for the Fed-

eral Motor Carrier Safety Administration (FMCSA); and Thomas Nelson, Kentucky FHWA Division Administrator who presented elements of the Fixing America's Surface Transportation (FAST) Act. The awards luncheon on day-two featured keynote speaker, Brigadier General Joe Ramirez (ret.), Commandant of the Corps of Cadets at Texas A&M University.

The closing session included a presentation by Chris Lambert, KYTC, and a panel discussion.

The conference had several different program tracks including Child Protective Services, Engineering, Education, Enforcement, and Emergency Medical Services (EMS). As part of the Education track, Northrop Grumman's Tim Emington, Operations Manager for the TRIMARC Program, was co-instructor for an FHWA Traffic Incident Management training class.



Tim Emington, TRIMARC Operations Manager, teaching a class on Traffic Incident Management at the 2016 Kentucky Lifesavers Conference in Louisville, KY.



Scott Evans, Manager, ITS Programs; Tim Emington, TRIMARC Operations Manager; and Rickie Boller, TRIMARC Senior Supervisor, attend the 2016 Kentucky Lifesavers Conference in Louisville, KY. Northrop Grumman was a Silver Sponsor.

## 2016 Purdue Road School Transportation Conference and Expo

On March 8th to 10th, Purdue University in West Lafayette, Indiana hosted the 2016 Purdue Road School Transportation Conference and Expo. A record-breaking 2,600 attendees attended the 102nd occasion of this annual conference.

Road School also hosts regional meetings of several affiliated professional groups, such as the County Surveyors Association and the Indiana Chapter of the Institute of Transportation Engineers. It is co-sponsored by the Joint Transportation Research Program (JTRP) and the Indiana Local Technical Assistance Program (LTAP).

### General Topics

This conference affords attendees with opportunities to receive Continuing Education Credits in a number of transportation related subjects including the following:

- Highway Funding
- Pavement Innovations
- Construction Practices
- Traffic and Safety Engineering Developments
- Engineering Education Opportunities

### Presentation Highlights

Some of the topics highlighted at this year's Road School are listed below:

- Probe Data use for prioritizing infrastructure investments and real time system performance
- Rumble Strips as an effective countermeasure for preventing roadway departure crashes
- Highway Rumble Strip research extended to airport taxiways
- DamageWise Program for recovering cost of damaged infrastructure due to crashes
- The use of J-Turns to improve intersection safety
- Roundabouts in Greenwood, IN
- Countermeasures to Roadway Departure Crashes - New Developments in Indiana
- Occupied Railroad Grade Crossing Status Notifications for emergency responders and for encouraging motorist diversions
- Several topics on optimizing traffic signals
- Use of drones in transportation
- Several unique bridge and road construction projects
- Several topics on asset management and roadway lifecycle practices
- Evolving traffic signal and lighting technologies

Presentations from this year's Road School can be downloaded at: <http://docs.lib.purdue.edu/roadschool/>

## 2016 ITS Midwest Annual Meeting

Thursday and Friday, September 22-23, 2016  
at the Marriott Louisville East in Louisville, KY

**Racing Towards Connectivity** is the 2016 ITS Midwest Annual Meeting theme. Our annual meeting program includes:

- Technical sessions on connected and automated vehicles, traffic management and operations, multi-agency collaborations, commercial vehicle operations, safety innovations, incident management, work zone ITS, transit applications, federal updates, and new technologies.
- Featured speaker Jill Ingrassia (Pictured right), Managing Director AAA and ITS America Chairperson.
- Technical tour of local ITS deployments.
- Night at the races social event at Churchill Downs.



Be sure to take advantage of member discounts by renewing your membership in ITS Midwest. For current information on the 2016 Annual Meeting, be sure to check our website at [www.itsmidwest.org](http://www.itsmidwest.org).

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### Meeting Registration

- Member: \$175 early bird, \$225 after 9/2
- Non-Member: \$225 early bird, \$275 after 9/2
- Student (Student ID required): Free (lunch not included), \$25 (lunch included)
- Special offer: 20% discount on 2017 ITS Midwest chapter membership available to non-members registering for the Annual Meeting. Offer not available to past or renewing members.

Note: Early bird registration ends September 2, 2016. The deadline to register online is September 16, after which only on-site registration is available. Credit cards cannot be accepted for on-site registration. The cost of the social event "Night at the Races" is not included in the meeting registration rates listed above. Payment of the social event fee of \$36 is available as an option during meeting registration.

Sponsorship and exhibitor opportunities are also available during meeting registration. See below for more information about exhibiting or being a meeting sponsor.

### Social Event: Night at the Races

As part of the 2016 ITS Midwest Annual Meeting, attendees will have the opportunity to enjoy a Night at the Races at the world famous Churchill Downs. We will board the bus at the host hotel and leave for the Track at 4:00 pm on Thursday September 22nd.

At the Downs, we will sit down in the same seats as the world's most revered racing enthusiasts in Millionaires Row where the dining room provides scenic vantage points to view the races from a tiered balcony overlooking the finish line or via television monitors from the comfort of your table.

Dining amenities include a Chef's Table buffet and cash bar service, as well as easy access to mutuel tellers, and self-service betting machines. A \$36 admission fee covers transportation, admission to the track, a race day program, and a full Chef's buffet. If you will join us at Churchill Downs, please make your reservations now to ensure your seat.

Note: The social event is optional, and the \$36 fee is not included in the meeting registration.

### Sponsorship

Sponsoring ITS Midwest gives you visibility and recognition as a leader committed to advancing ITS. Sponsors gain valuable opportunities to strengthen or build partnerships with a



maximum number of participants. Our members have been in the ITS business for many decades and are involved in all facets of transportation planning, development, deployment and research.

In addition to the complimentary registrations noted below, all sponsorship levels allow for one additional meeting registration at a reduced fee of \$75.

Sponsorship benefits vary depending on the package chosen:

- **Diamond:** \$2000 - includes (4) complimentary registrations, your 3 minute company video shown during the meeting breaks (if provided), and a full page in the meeting booklet, and company logo displayed at all breaks and lunch
- **Platinum:** \$1500 - includes (3) complimentary registrations, your 1 minute company video shown during meeting breaks (if provided), 1 full page in the meeting booklet, company logo displayed at all breaks and lunch
- **Gold:** \$1000 - includes (2) complimentary registrations, 1/2 page in the meeting booklet, company logo displayed at all breaks and lunch
- **Silver:** \$500 - includes (1) complimentary registration, 1/4 page in the meeting booklet, company logo displayed during a specific break

Sponsorship registration is available as an option during online meeting registration (above).

## Exhibitor

\$375 - provides display table with power and Wi-Fi in the Exhibitor Hall and includes one complimentary registration and one registration at a reduced rate of \$75. Exhibitor registration is available as an option during online meeting registration. There may be additional charges for power based on the hotel policies.

## General Questions

For information on registration, lodging, presentation opportunities, exhibiting, sponsorship, or any other annual meeting questions, please contact David Zavaterra at 773-802-1541.

## Hotel Reservations

The 2016 Annual Meeting will be held at the Marriott Louisville East located at 1903 Embassy Square Blvd, Louisville, KY 40299. The venue is a Four-Diamond hotel and the Official Hotel of the Kentucky Bourbon Trail. Each room has luxurious "Revive" beds, high-speed wireless and wired internet access, 42" flat panel HDTV, telephone with speaker phone, voicemail, ergonomically designed desks, and in-room complimentary safe and refrigerator.

ITS Midwest has reserved a block of rooms for the evenings of Wednesday, September 21 and Thursday, September 22 at a discounted event rate: \$159/night (single) for a Standard King or two Queen Beds. Reservations can be made online or by calling 1-877-901-6632 to get the special rate.

For more information or to book the special hotel rate, visit the venue reservation website. Reservations must be made by August 28th to get the discounted rate. You are encouraged to book early to ensure availability at the special price.

## Call for Abstracts

The ITS Midwest Conference Outreach Committee invites you to submit an abstract for presenting at the Annual Meeting. Abstracts must be submitted online using our submittal form.

The annual meeting theme looks forward to a connected environment for mobility, facilitated by intelligent transportation and communications technologies. Please join ITS Midwest in presenting your thoughts and your work to contribute to a shared vision of a connected transportation future.

**Submission deadline is August 26, 2016.**

## Project of the Year

Nominations are being accepted for 2016 Project of the Year. Nominations must be received no later than September 1, 2016.

Nomination instructions are at <http://www.itsmidwest.org/2016AnnualMeeting/>



## Latest Member Roster

### Member Organizations:

AECOM  
 Argonne National Labs  
 AutoBase, Inc.  
 Carrier & Gable, Inc.  
 CDM Smith  
 CH2M HILL  
 CHA Consulting  
 City of Chicago  
 CohuHD  
 Daktronics, Inc.  
 Federal Highway Administration  
 G4S Secure Integration  
 Global Traffic Technologies, LLC  
 HNTB Corporation  
 Illinois Department of Transportation  
 Illinois Tollway  
 INRIX

Iron Mountain Systems, Inc.  
 Iteris, Inc.  
 ITRCC  
 J.A. Watts, Inc.  
 Jacobs Engineering Group, Inc.  
 Kimley-Horn and Associates,  
 Lake County Division of Transportation  
 Mid-West Truckers Association  
 Northrop Grumman  
 Pace Suburban Bus Service  
 Parsons  
 Q-Free Open Roads Consulting  
 SDI  
 SES America  
 Swarco Traffic Americas, Inc.  
 TEC Engineering, Inc.  
 The Ohio Department of Transportation  
 TMS Engineers

Total Traffic & Weather Network  
 TrafficCast International, Inc  
 TranSmart Technologies  
 University of Illinois at Chicago  
 University of Kentucky  
 Ygomi, LLC

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 Siva Ayyadurai  
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 Darryl Dawson  
 Luis Galimberti  
 Eric Gannaway  
 James Gilbert  
 Brian Plum  
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 Brian Scifers  
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