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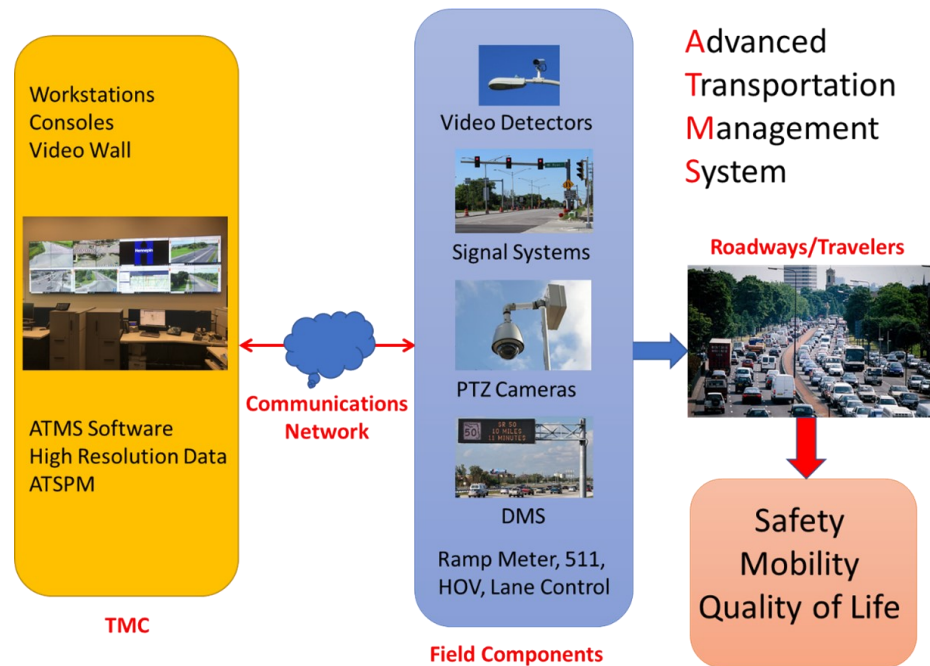
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Developing and Using Advanced Transportation Management System – A Local Agency Experience

Ben Hao | Hennepin County

In each issue, the INCITER features an article coordinated by one of NCITE's technical committees. This article is a contribution from the **Intersection Traffic Control Committee**.

The use of an Advanced Transportation Management System (ATMS) has been more and more essential to enhance traffic safety and mobility, which is vital for economic growth and high quality of life. An ATMS integrates a Traffic Management Center (TMC) with all field traffic control and operational devices over a communications network. It allows transportation professionals and decision makers to perform a broad range of actions in providing and implementing safety and mobility critical solutions to public transportation. A TMC serves as the core in the ATMS that provides a platform and resources to monitor real-time vehicular traffic, signal operations, intersection performance, and roadway capacity. It also facilitates the coordination between state and local authorities to reduce congestions during peak hours, special events, and emergencies by proactively deploying advanced traffic signal control strategies. Figure 1 shows a diagram of a typical ATMS.



(Continued on page 6)

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PRESIDENT'S MESSAGE

Kevin Peterson, 2021 NCITE President

Happy Fall NCITE Members!

Since my last update several NCITE members attended the inaugural Great Lakes District Annual Meeting in Colobus Ohio. This meeting consisted of two days of engaging presentations, technical tours, and social events. I was also fortunate to see several NCITE Section Members take home awards! Congratulations to **SRF**, the **City of Fargo**, and **NDDOT** for winning the Transportation Achievement Award in the Complete Streets category; **Alliant Engineering**, and the **City of Duluth** for winning the Transportation Achievement Award in the Transportation Systems Management and Operations category; **Alliant Engineering** and the **City of St. Paul** for winning the Transportation Achievement Award in the Safety Category; and **Bolton and Menk** and the **City of Prior Lake** for winning the Transportation Achievement Award in the Traffic Engineering Category. NCITE also cleaned house in the individual awards with **Tyler Krage** being recognized as a District Rising Star and **Nick Erpelding** winning the GLITE Transportation Professional of the Year Award. Finally, I was honored to accept the **Section of the Year Award on behalf of NCITE**. Great work to everyone, it's great to showcase the work we are all doing.



Kevin Peterson
President

2021 Board elections are live until November 7, please make sure to vote. If you have misplaced your notice or did not get one in your email, let me know.

Looking ahead the Board busy planning the **2021 NCITE Annual Meeting**. This years event will be held at Park Tavern in St. Louis Park on Tuesday November 16. We are excited to recap 2021, announce award and election winners, and most importantly, have some fun!

Finally, I'd like to personally thank the 2021 Board! This year as president has flown by. Without the teamwork and effort of the board this year would not have been nearly as successful or fun. The great ideas and commitment to the organization I saw from the board this year was inspiring. Thank you all, I can't wait to see what 2022 has in store for NCITE. To those of you considering getting more active in NCITE, I'd highly encourage you to get involved in any way you can, we'd love to have you.



UPCOMING EVENTS

ite Calendar

ITE Calendar for District, Section, & Chapter Meetings

Stay Connected with Virtual Events

Online | Dates Vary



Attend an Upcoming NCITE Technical Committee Meeting!

Check out upcoming topics here.

For more information on the committees and how you can get involved:

https://nc-ite.org/Committee_Listing

For professional development opportunities:

http://nc-ite.org/content.php?page=Professional_Development_Meetings

YMC UPDATE

The YMC has held several events over the last couple months. In August, we held a joint kickball event with the **APWA-MN Young Professionals** group (see photo below). While the YMC didn't officially get the win, we did donate a couple of players to the APWA team, so it's fair to say we're still technically winners!

In addition to this, the YMC hosted a panel with the student chapter of ITE at the **University of Minnesota (ITSO)** earlier this month. We had 5 members attend and present about what type of work they do and what it's like to be a young professional.

Thanks all for a great 2021! It was great to see familiar faces and new ones, and we hope to see you at future YMC events.



NCITE YMC & APWA-MN Kickball 2021

If you would like to be added to the YMC email list, or know of any new hires/coworkers that would enjoy our events, please send email addresses to

Jack Olsson (Jack.Olsson@kimley-horn.com) or **Cameron Valuch** (cvaluch@alliant-inc.com)

Hennepin County Public Works manages traffic and signal operations along more than 2,200 lane miles of county roads. Back in the 1990s, Hennepin County built its first ATMS with the TMC located at the public works facility in Medina, Minnesota. The TMC was equipped with analog TV monitors, a dial-up phone modem, and a central traffic signal control software (CTSCS) of Econolite Aries. After 20 years of operations, the Aries software is no longer supported by the vendor. The phone line-based interconnections and dial-up modems significantly limited automated traffic signal monitoring and operations. The outdated ATMS could not meet the needs of providing reliable and effective real-time signal control operations and traffic management, nor could it support implementing advanced signal control strategies. In addition, Minnesota Department of Transportation (MnDOT) and several partner cities and counties were also in the action of implementing a new ATMS. In 2015, Hennepin County began upgrading its ATMS and TMC to modernize traffic operations, maximize traffic flow throughout Hennepin County, and enhance system interoperability and expandability, which provides benefits to all Hennepin County roadway system users in the long term.

The ATMS upgrade project includes developing a county-wide fiber optic communications network, achieving high-speed data transmission, implementing an advanced traffic signal control software, deploying pan-tilt-zoom (PTZ) cameras, upgrading outdated signal controllers and video detectors, and remodeling the TMC with a new video wall and communications system. These upgrades allow Hennepin County traffic staff to better manage signal operations and provide commuters with better traffic progressions within Hennepin County and at boundary areas between neighboring jurisdictions. The new ATMS and TMC also create an integrated traffic management environment by interfacing with ATMS's hosted by partner agencies. Figure 2 illustrates the architecture of Hennepin County ATMS.

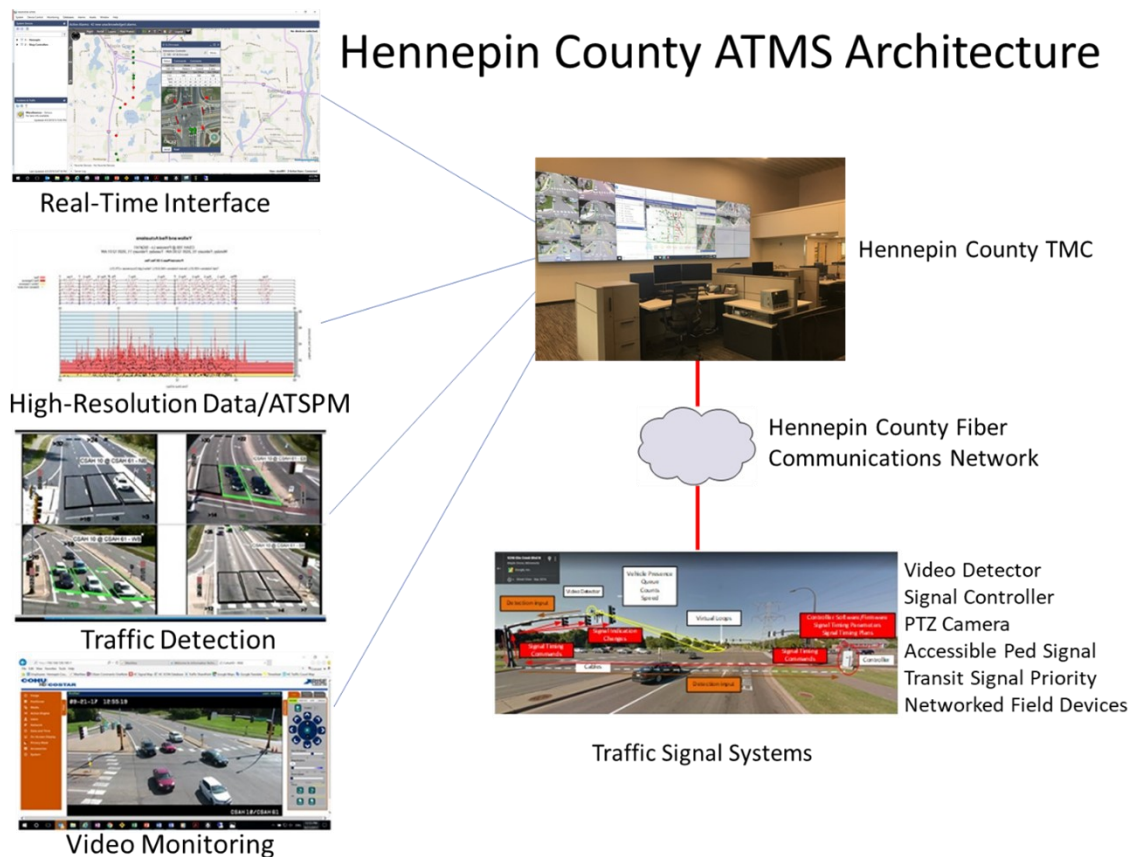


Figure 2: Hennepin County ATMS Architecture

Developing and Using ATMS (continued from page 6)

With the progress of the ATMS development, Hennepin County traffic staff have been receiving its benefits in many areas.

The ATMS significantly enhances the efficiency of traffic signal operations. The county-wide fiber network provides reliable high-speed communications between the TMC and traffic signal operation devices at signalized intersections. These devices include but not limited to switches, traffic signal controllers, video detection communication interface units, malfunction management units, battery backup monitoring units, and potentially accessible pedestrian signals and signal preemption systems. The communications network allows county traffic engineers and signal technicians to remotely access these devices and perform traffic signal operations by uploading, editing, and downloading traffic signal timing data in real-time at any locations where a secured county network is available.

When the COVID-19 pandemic became severe in Minnesota during mid-March of 2020, vehicle traffic volumes decreased dramatically. The time-of-day signal timing plans designed for heavier traffic flows during AM and PM peak periods started introducing delays at intersections along county roadways due to the reduced traffic demands. Thus, cycle lengths and splits operated on the county corridors during peak periods were required to be shortened to effectively accommodate the decreased traffic volumes on mainline roadways while minimizing vehicle delays on crossing streets. The TMC team effectively accomplished this goal by fully utilizing the upgraded ATMS being developed. By remotely accessing the controllers through the ATMS software (Intelight MaxView) from their homes, the TMC staff were able to upload the signal timing database from signals controllers in the field, review the database, select optimal timing plans for weekdays and weekends, configure these plans into schedule-based commands in MaxView, and then download these commands back to the field signal controllers. This made the adjusted signal timing effective in the field immediately. With this process, county traffic staff were able to adjust signal timing in real-time for a total of 160 coordinated signals that were currently connected to MaxView along 14 county corridors within two days. The effectiveness of adjusted signal timing was validated by reviewing the real-time signal timing status in MaxView and observing the real-time traffic operations via PTZ cameras. This effort would have taken the team several weeks without the current ATMS.

The ATMS improves the efficiency of public services. When a signal timing related service request or complaint is received, county traffic staff is able to remotely retrieve the signal timing data operating in the field controller and review the data in detail. Based on the time of day when the signal timing issue was experienced, traffic staff can perform a targeted review to identify the cause of the issue. By remotely implementing the adjustments of cycle length, splits, offsets and other timing data, the signal timing deficiency can be addressed effectively. The results can also be confirmed by remotely observing the field traffic and signal operations via ATMS interface and PTZ cameras. The remote access and control of signal operations significantly save the time originally needed to perform onsite troubleshooting and thus, better serve the public by reducing the response time to service requestors.

The ATMS allows TMC staff to better monitor system performance and proactively address any communication and maintenance issues. The ATMS software MaxView provides an interactive web-based map that displays a centralized view and provides a total control of the entire signal network. The dashboard in the map shows the statistics of key signal operational measures for all networked signals on county roadways. These status measures include but are not limited to communication failures, signals in flash, timing patterns and coordination status, preemption events, and bad signal plans. TMC staff are able to use these network status parameters to proactively identify and address any potential signal timing and operational issues on a daily basis. Both isolated signal communication failures or a group of communication failures registered by the ATMS are reported to the county Netcomm team and community connectivity team respectively through a ticketing system. The root causes can be identified such as physical fiber disconnections, defective hardware/software, firewall setup or field construction incidents. Proper resolutions can be effectively implemented to ensure timely restoration of communication. In addition, the ATMS is able to generate and distribute a set of real-time system alarm notifications. A total of 39 signal operations focused alarms are available in MaxView. These alarms include detailed information on what and when these issues are detected, which allows the TMC staff to actively identify weak areas and suggest solutions. This information also supports

the collaboration with county signal shop staff, IT staff, and partnered agencies to address any issues collectively. The system performance status and alarm notifications considerably assure the integrity and quality of signal operations and the implementation of congestion reduction strategies in the long term.

The ATMS provides automated traffic system performance measures (ATSPMs) to allow TMC staff to perform the most detailed review of signal operations. By configuring vehicle presence and counting detectors in ATMS software, high-resolution records of all signal operation events are logged in a data server which allows ATMS software to generate and display a suite of ATSPMs in graphical formats with descriptive statistics. The TMC staff are able to identify possible causes of signal timing deficiencies and signal operational issues quickly, such as traffic volume changes, signal operation anomalies, faulty detectors, preemption events, weather impacts, hardware and software issues and any other possible factors. A total of 12 ATSPMs are available in the current county ATMS software. Here are some examples - A phase termination diagram can capture a possible faulty detector if max-out events are constantly occurring throughout a mid-night period. A split monitor diagram can identify a green time deficiency for a non-coordinated phase if force-off events are logged in every cycle during peak periods. A split deficiency can be identified using both a split monitor diagram and split failure diagram. The Purdue coordination diagram visualizes the vehicle arrivals with respect to the signal state and recommends offset adjustments to maximize throughputs for the coordinated phases. A preemption event diagram can help identify when the coordinated timing might be interrupted which could possibly result in a long wait time complaint. The ATSPMs provide great resources and references that help effectively identify any signal timing issues and provide solutions.

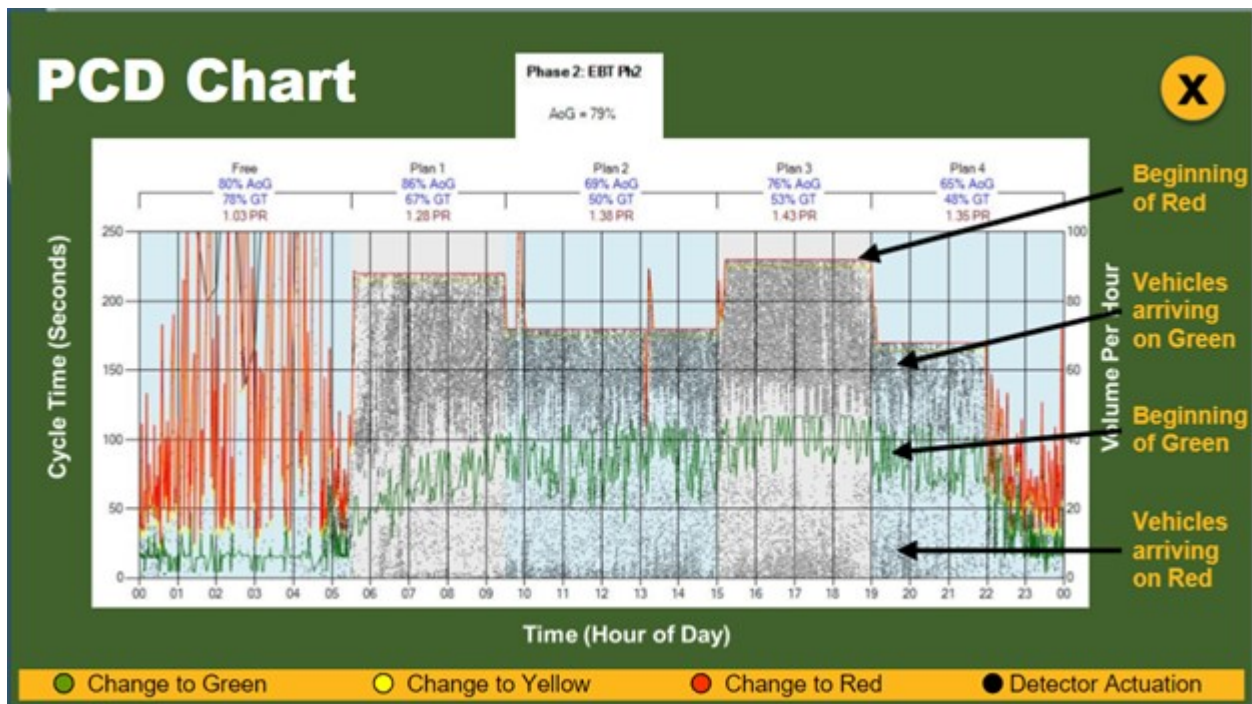


Figure 3: A Sample of Purdue Coordination Diagram (Adopted from NHI ATSPM Training)

The ATMS improves safety and efficiency for field signal maintenance operations. With a remote access to signal controllers and other networked traffic devices, county traffic staff are able to perform their duties without going to the field when physically assessing signal cabinets becomes challenging and unsafe due to severe weather or other situations. The ATMS platform allows them to remotely program the controller in real-time and monitor the impact to the field traffic with PTZ cameras. This helps signal shop staff perform troubleshooting and other maintenance work when physically accessing field devices is challenging.

Developing and Using ATMS (continued from page 8)

In addition, many third party ATMS software packages are commercially available that can be considered as supplementary tools to the county ATMS. These software platforms provide various traffic signal and ATMS system performance measures that are not available in current county ATMS software. These commercial packages feature algorithms and dashboards to validate data integrity, identify traffic signal timing deficiencies, audit detector anomalies, provide recommendations to signal timing issues being detected, and demonstrate performance improvements by comparing before and after ATSPM data.

Hennepin County is committed to continue developing and enhancing the county ATMS to support all internal and external stakeholders. It is anticipated that the ATMS will provide more and more benefits in signal operations, traffic management, and public services with continuous software advancement and potential implementation of traffic responsive and adaptive signal control strategies.



TECHNICAL COMMITTEE UPDATE



Geometric Design Technical Committee

The Geometric Design Committee is in need of a new Committee Chair. Any interested parties should contact Kevin Peterson at kevin.peterson@co.washington.mn.us.



Intersection Traffic Control Technical Committee

Committee Chair: **Cade Botten** - Cade.Botten@hennepin.us

Recent Agenda Items: Discussion on transit signals, TSP, and railroad preemption.

Future Agenda Items: CAV and ITS updates, state of the practice, and SPAT/MAP updates.

Next Meeting: TBD



Emerging Technologies in Transportation Technical Committee

Co-Chairs: **Jake Eisinger** jake.eisinger@co.washington.mn.us **Zach Parsons** Zach.Parsons@boltonmenk.com

Recent Agenda Items: MnDOT Test Sites for Passive Ped Detection, FLIR Case Studies in TX area. ITSMN Fall Forum recap.

Future Agenda Items: TBD

Next Meeting: 8-10am Tuesday January 25th, 2022



Complete Streets and Safety Committee

Committee Chair: **Hannah Johnson** - HJohnson@alliant-inc.com

Recent Agenda Items: No recent meetings

Future Agenda Items: No planned meetings

Next Meeting: TBD



Planning Methods and Applications Technical Committee

Committee Chair: **Krista Palmer** - kpalmer@srfconsulting.com

Recent Agendas Items: TBI survey results

Future Agendas Items: No planned meetings

Next Meeting: TBD



Traffic Operation and Maintenance Discussion Group

Committee Chair: **Greg Boche** - greg.boche@woodburymn.gov

Recent Agenda Items: RRFB experience, full depth fiber form tube discussion, & new spec discussion on signal head wire pulls, & hydraulic torque requirements.

Future Agenda Items: TBD

Next Meeting: 11:30am Wednesday December 1st, 2021 (First Wednesday of each month)



Simulation and Capacity Analysis Technical Committee

Committee Chair: **Sudheer Dhulipala** - SDhulipala@wsbeng.com

Recent Agenda Items: Presentation by Brian Kary iPeMS software from Iteris

Future Agenda Items: TBD

Next Meeting: TBD

Retroreflectometer Testing

American Engineering Testing

In each issue, the INCITER features articles coordinated by NCITE's advertisers.
This article is a contribution from **American Engineering Testing**.

Many road users see signage, guardrails, and pavement condition as road features, however pavement markings – despite their goal of visibility – can be invisible to users in terms of a road feature that requires monitoring and maintenance. The road owner understands the importance of markings to guide drivers and pedestrians as designed to maintain safe travel.

In INCITER Fall 2019, AET discussed the mobile retroreflectometer used to assess pavement markings in terms of retroreflectivity, a metric for the luminescence or visibility of the marking. Retroreflectivity is measured in units of millicandelas per square meter per lux ($\text{mcd}/\text{m}^2/\text{lux}$). The Federal Highway Administration (FHWA) recommends a minimum value between 50 and 250 $\text{mcd}/\text{m}^2/\text{lux}$ for roadways, depending on the posted speed limit and whether there are striped edge lines in addition to the centerline.



Retroreflectometer Testing in Carver County

The retroreflectometer testing is operated from a vehicle at road speeds and scans the stripe at 400 times per second. Retroreflectivity testing can be performed on existing or newly striped roads in a dry condition, typically in 0.1-mile intervals. Depending on the road age, the results will be viewed differently. For instance, for new construction the road owner's construction specification may contain parameters for acceptance of the markings as completed by the contractor.

Mobile reflectometer testing is performed according to ASTM E 1710 ("Standard Test Method for Measurement of Retroreflective Pavement Markings Materials with CEN-Prescribed Geometry Using a Portable Reflectometer"). This test standard replicates a person viewing the material from 30 meters away. The test standard allows for temperatures between 20°F and 122°F, humidity up to 95%, day or night conditions, and markings in clear and dry condition.

The reflectometer system can be configured to account for marking color and type (e.g. solid white edge line, broken yellow centerline, double solid yellow centerline, etc.). In addition to retroreflectivity, the system also records HD video and measures stripe width and contrast between the marking and the pavement, and all marking data is coupled with GPS coordinates, temperature, humidity, and date/time. The system overlays video with retroreflectivity data and GPS coordinates to allow for cross-referencing with other pavement management databases.

Retroreflector Testing (continued from page 11)

Since publication of the Fall 2019 article, several state and local agencies have begun utilizing the retroreflector to manage their pavement markings. A northern Minnesota county has been incorporating retroreflector testing into their asset management system to optimize effort and management outcomes. The County schedules scanning intervals for its roadways so that the markings on its road network can be assessed in stages. This effort has improved their ability to time when markings are rehabilitated – that is, not too soon to avoid waste of a marking that meets requirements, but not too late to avoid unsafe road conditions.

A Minnesota county near the Minneapolis-Saint Paul metropolitan area uses retroreflectivity to evaluate existing markings on specific roadways rather than their full road network. This focused use of the system allows them to monitor marking performance under higher volumes of traffic and quickly respond to re-striping needs to maintain their standards of safe roads for the traveling public.

Public works staff at these counties are realizing the benefit of utilizing retroreflectometers as a road management tool. As the reflectometer is vehicle mounted and operates at posted speed limits, it does not disrupt traffic and safe both the retroreflector operator and the road user.

A county agency that previously adopted an established striping schedule for their roads (i.e. re-striping performed at fixed intervals regardless of stripe performance) has recently experimented with the mobile retroreflector to monitor the reflectivity of the striping of their roads. They have tested their road markings in the spring, with the intent of follow-up testing of the same roads in the fall. The County intends to evaluate loss in performance and estimate the remaining performance life in markings to anticipate re-striping (i.e. planning and budgeting) .

Pavement markings are recognized as one of the most cost-effective safety features of a roadway. The mobile reflectometer is an accessible tool to monitor the performance of these features. Furthermore, the County experiences provided illustrate that municipal agencies are becoming more familiar with the retroreflector, and more agencies will familiarize themselves with it and incorporate it into their management procedures. By using the retroreflector as part of its regular management practices, agencies can optimize their use of staff time/budgets and maximize the performance life of in-place markings. These efforts ensure that road markings meet safety standards and agencies avoid waste by re-striping unnecessarily.



The Evolution of Speed Limits

Jennifer McCoy, PE, PTOE | Bolton & Menk

In each issue, the INCITER features articles coordinated by NCITE's advertisers.
This article is a contribution from **Bolton & Menk**.

Speed limits stimulate a lot of discussion—they shape our communities and our transportation network, and influence safety. Across the nation, communities are evaluating their vision and modifying their approach to setting speed limits, incorporating factors such as crash history, roadway context, and the presence of vulnerable road users.

Speed Matters

Fatality and injury risk increase as speeds rise. Each year, over a million lives are lost globally from traffic crashes. In 2018, an average of more than 100 people lost their lives on US roads each day, with speeding involved in 1/3 of these fatalities.

A well-documented study in 2011 by AAA showed that pedestrians and bicyclists are more vulnerable and have a higher likelihood of injury in higher speed crashes. More cities are using alternative approaches for setting speed limits on local roads, like the Safe System approach, which aims to eliminate fatal and serious injuries for all road users.

Practitioners are often left wading through the sea of mixed opinions as the topic of speed limits continues to be an open debate.

Across the US

The current guidelines for setting speed limits are under review by organizations such as the National Transportation Safety Board (NTSB), the National Committee on Uniform Traffic Control Devices (NCUTCD), and Federal Highway Administration (FHWA). They have proposed changes to the Manual on Uniform Traffic Control Devices (MUTCD) to remove the guidance that speed limits should be within 5 mph of the 85th percentile speed and encourage use of the Safe System approach.

In 2021, proposed amendments to the MUTCD, changed verbiage for speed zones to better define road context and provide guidance that 85th percentile speed be used on freeways/expressways and rural highways in non-urban areas, while leaving urban areas open to other approaches.

Across the Region

In North Dakota, lawmakers considered a bill earlier this year to raise the speed limit on Interstates 94 and 29 from 75 mph to 80 mph. South Dakota raised their speed limit to 80 mph on the interstate in July 2017.

In Minnesota, a growing number of cities have recently lowered their speed limits systemwide to 20 or 25 mph including Minneapolis, St. Paul, St. Louis Park, and Rochester. In 2019, the Minnesota State Legislature amended a state statute to allow cities to set speed limits on roads under their authority. Prior to this, a city interested in changing a speed limit had to request an engineering study from MnDOT.

In 2020, a vision for speed limits in Minnesota was established through collaborative engagement of a diverse group of technical advisors and transportation users.

A continued evolution

The conversation continues with FHWA's Safe Systems campaign, anticipated changes to the MUTCD, and application of different speed limit setting practices.



**STATEWIDE
Speed Limit Vision
PROJECT**

VISION STATEMENT

Speeds limits are set with an emphasis on all users with key influences of **safety, engineering, and surrounding land use.**

Core Values

Speed limits are:

- 1** Affected by community context, land use, and road design.
- 2** Governed by voluntary compliance through education and accepted social norms.
- 3** Established through consistent technical evaluation and applied equitably across all communities.

Image Source: Bolton & Menk

Nationally, the City Limits Guide, published in 2020 by National Association of City Transportation Officials (NACTO), provides guidance on setting speed limits on urban streets using a Safe System approach to reduce fatalities and injuries. NCHRP 17-76 “User Guide for Posted Speed Limit Setting” published in 2021 by the Transportation Research Board is a national speed management guide for agencies that establishes a uniform process to setting speed limits. The article “A Model for Setting Credible Speed Limits in Urban Areas” by Linda Bellalite, PH.D. published in 2013 by ITE provides a model for setting credible speed limits in urban areas based on eight key parameters. These parameters include number of lanes, visual clearance width, length of study zone, surrounding land use, access points, on-street parking, pavement width, and commercial building presence.

Locally, the Minnesota Local Road Research Board (LRRB) is actively conducting research to provide tools and guidance for city practitioners in how to best set speed limits for their streets.

To keep apprised of what’s next for speed limits in Minnesota, visit: mnspeedlimitvision.org. For what’s happening nationally, visit safety.fhwa.dot.gov/zerodeaths/zero_deaths_vision.cfm.

Improving the Traveler Experience at MSP

Chris Whelan, PE | Kimley Horn

In each issue, the INCITER features articles coordinated by NCITE's advertisers. This article is a contribution from **Kimley Horn**.



Image Source: Kimley Horn

The Metropolitan Airports Commission (MAC) is consistently seeking creative ways to enhance the traveler experience at the Minneapolis-St. Paul International Airport (MSP). In 2018, Kimley-Horn partnered with MAC staff in identifying means to improve the driver experience on the Inbound Roadway to Terminal 1. In reviewing with MAC staff, a few common traffic incidents were identified that contributed to traffic disruptions at Terminal 1 including:

- **Parking Diversions:** In the pre-COVID environment, the Terminal 1 parking ramps often reached capacity, requiring active management by airport staff to redirect travelers to alternative parking options on the MSP campus. As a result, significant queues were observed at the Terminal 1 Entry Plaza as vehicles were directed elsewhere.
- **Over-height Vehicle Intrusions:** The surrounding highway network accommodates taller vehicle heights than the Terminal 1 roadways are able to handle. Despite restrictive upstream messaging on the surrounding roadway network serving MSP, over-height vehicles would often enter the Terminal 1 campus, requiring airport staff to navigate their exit from the airport campus prior to the vehicles reaching the height-constrained areas. This navigation typically impacted traffic on the Terminal 1 roadways.
- **Variable Curbside Congestion:** The Terminal 1 Arrivals and Departures curbside roadways often experience congestion at different times due to flight bank schedules.

Improving Traveler Experience at MSP (continued from page 15)

Through collaboration with MAC, alternative overhead signing scenarios were developed with the goal of virtually managing the incidents noted above. In addition, MAC's IT department was engaged to integrate the alternative messaging scenarios into an intuitive system that could be actively managed by appropriate MAC staff.

In 2019, design was underway to install a series of overhead variable message signs at key locations to allow typical destination-based messaging to be replaced with messaging to convey appropriate action to drivers based on the incidents noted above. Since the installation of the signs in the summer of 2019, the MAC has been able to manage common incidents via the following means:

- **Parking Diversions:** MAC's Landside Operations department monitors parking availability at Terminal 1 and is able to implement alternative messaging to direct customers seeking parking to alternative options with the push of a button as the Terminal 1 facilities reach capacity.
- **Over-height Vehicle Intrusions:** An infrared over-height vehicle detector detects vehicles and automatically implements alternative messaging to direct the vehicle offsite.
- **Variable Curbside Congestion:** MAC's Landside Operations department monitors curbside congestion and is able to implement alternative messaging encouraging the use of both curbside roadways during peak periods.

In conclusion, Intelligent Transportation Systems (ITS) provide transportation authorities with interesting means to manage messaging to vehicle traffic. The MAC has experienced the benefit of ITS through the implementation of the Variable Messaging System at MSP, and we're excited to observe the power of ITS as additional technologies work their way into the transportation industry.



Signal Performance Measures

Barney Sachs | Traffic Control Corporation

In each issue, the INCITER features articles coordinated by NCITE's advertisers.
 This article is a contribution from **Traffic Control Corporation**

Signal Performance Measures or SPM's have changed the way that our industry is thinking about data and operations of traffic systems. Since the FHWA talked about this in their Every Day Counts EDC-4 Report in 2019 we have seen the value of SPMs. Now agencies are challenged with two aspects, how to implement and how to turn the data into actionable items. In 2019 Econolite Control Products developed an exciting option to their on premise ATMS solution, Centracs Mobility. Centracs Mobility is a cloud-based, high-resolution traffic data collection and analytics software platform designed to be a robust solution providing transportation agencies and professionals new capabilities to proactively optimize traffic signals. The cloud-based component of Centracs Mobility is hosted in the Microsoft Azure Cloud. The original design requirements came from the need of agencies to better support the huge amounts of data being generated through Signal Performance Measures (SPMs). On average traffic controllers can generate 35MB of data per day, and across a system of 100 intersections that's about 1.3 Terabytes of data annually. Initial SPM adopting agencies found themselves without the data storage space or computing power to effectively manage this data set. Centracs Mobility leverages Cloud computing for larger data storage and faster computing power.



Image Source: Pexels.com

Since its inception in 2019 Centracs Mobility has had added features utilizing the SPM data set to make intelligent decisions about intersection operations. Including Timing Optimization and Adaptive Control, including Cycle Length Adjustments. Centracs Mobility helps agencies provide smooth traffic flow while maximizing throughput of signal system. In addition, Econolite has added optional essential ATMS functionality to Mobility, such as Data Base Upload/Download, Event Alerting, and Controller Remote Front Panel. Access to Centracs Mobility is via a standard web interface. There is no VPN or other SW to install on the agency's client machines, instead Econolite stands up a dedicated web link that can be accessed from a web browser anywhere in the world.

Centracs Mobility can replace the traditional, manual time-intensive, and costly process of retiming traffic signal. Centracs Mobility provides high resolution traffic data collection and analytics that is not affected by escalating traffic count costs or limited by infrequent retiming intervals. Centracs Mobility leverages the Purdue Link Pivot and Red and Green Occupancy Ratio algorithms for optimizing offsets and splits. Cycle length optimization is managed volume to capacity parameters that put the user in control of the process. The Centracs Mobility web interface provides powerful diagnostic dashboards providing an overview of general traffic system health. Dashboard views include an indication of overall system health and performance.

Signal Performance Measures (continued from page 17)

The system is capable of showing locations with degraded signal performance as a ‘Heat Map’ automatically. Analytical tools help identify problem areas and enables users to understand what issues are affecting traffic flow, the traffic signal changes that need to be made, and how well those changes are working. Centracs Mobility transforms qualitative and quantitative data into actionable information transcending the capabilities of any other ATSPM tool set on the market.

While dashboards are powerful, perhaps the one thing that sets Centracs Mobility apart from any other system in the market today is the ability to develop new timing patterns on the fly including cycle, split and offset calculations. The days of manually developing plans at extraordinary costs once every few years are nearly gone. Centracs Mobility has added optional module to manager traffic flow by automating the optimization of signal timing.

Today, through partnership with Purdue University, we have developed a new methodology for signal optimization and incorporated this technology into Centracs Mobility. This means, with a simple push of a button, the high-resolution data collected in real-time goes to work to develop new plans at a fraction of the cost. Moreover, this can be done as often as may be deemed necessary by the traffic engineer.



Image Source: Pexels.com

Using Advanced Traffic Simulation Technology for Construction Staging and Maintenance of Traffic

Do Nam | WSB

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Construction operations on roadways disrupt normal traffic flow and generate undesirable delay. As traffic continues to increase throughout many metro areas, the Federal Highway Administration has been encouraging DOTs to be more proactive in their maintenance of traffic during construction.

Good construction staging provides safe and efficient traffic operations throughout a project to minimize impacts on the community during construction. WSB has begun development of traffic models that simulate the flow of traffic under different staging scenarios. These traffic simulation models consider all available routes, how construction will impact these routes and how much additional time this will add for commuters. These models are being used to determine if there are improvements that need to be made on any surrounding routes to allow for better operations throughout construction.

This new approach is more proactive than past construction staging methods and is based upon data. By modeling actual construction conditions, we're able to pinpoint where potential challenges may occur during construction and how to avoid them. Below is a list of potential benefits of construction staging and maintenance of traffic modeling using traffic simulation.

The benefits of advanced traffic simulation for construction staging and maintenance of traffic

- By understanding what the impacts to the community are, we can be more proactive in mitigating them.
- If we better understand what routes traffic will use, we can ensure that traffic controls are set up to accommodate additional traffic volumes.
- Limit changes can be evaluated.
- Informs decisions on critical maintenance items.
- Provides a public engagement tool for cities and residents.

Through advanced traffic simulation technology, we've been able to enhance construction staging plans resulting in better projects.



Image Source:
WSB



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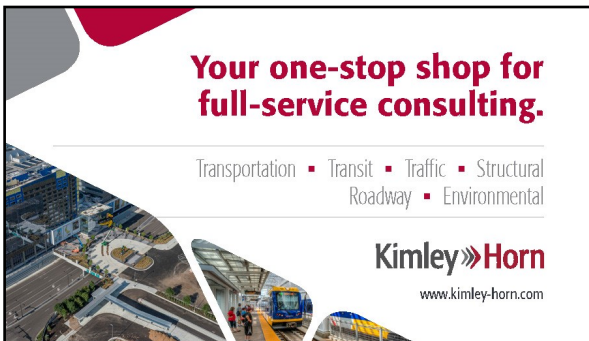
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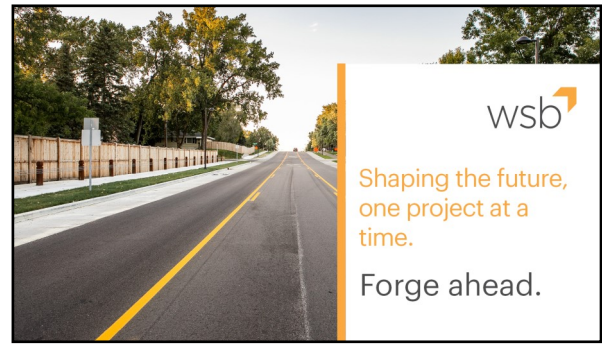
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Source: Dilbert

MEMBERSHIP UPDATE

New Members

Mitchell Sforzini, Ulteig

Ross Baker, MnDOT

Nick Meyers, StreetLight Data

New Student Members

Tyler Kleinsasser, South Dakota School of Mines & Technology

Moves

Niloy Saha, Bolton & Menk, formerly NDSU

Matt Pacyna, Transportation Collaborative & Consultants, LLC, formerly SRF Consulting Group, Inc.

Kristin M. Carlson, LexisNexis Risk Solutions, formerly University of Minnesota Center for Transportation Studies

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