Note: Results from polling questions asked during this web meeting are at the bottom of the document.

History and Progress of ATSPMs

C: **Russell Holt (Rhode Island DOT):** Utah should be proud and thrilled with its high percentage of signals with remote connectivity. Many jurisdictions across the U.S. (like mine) still have a long way to go to get above 25%, 15%, or even 10%. Good work Mark (and Lisa in past).

A: Mark Taylor (Utah DOT): Thank you - we've got a good team here at UDOT making it happen. They work with private telecoms. It's helped us out quite a bit.

Q: **Isaac Alvarez (New Jersey DOT):** I thought Garrett Morgan invented the signal.

A: Mark Taylor (Utah DOT): Garrett Morgan invented the signal in 1914 in Cleveland Ohio. Lester Wire created the first one in Salt Lake City at the intersection of 200 South and Main Street in Salt Lake City in the year 1912. After a few years, he ran off to WWI and never got a patent for it. That's why the history books are a little gray.

Q: **Lisa Miller (The Eastern Transportation Coalition):** You noted having 67,000+ metrics in one year. You mentioned consultants are using those metrics. What are they using your metrics for?

A: Mark Taylor (Utah DOT): People are using it for everything. In fact, there are some people/agencies that are using it, that we were not aware of. For example, the UDOT website was down a year ago which I didn't know about it. An individual from one of the cities in Utah called and told me. He was an economic development advisor; they use the website to look at traffic volumes in their city. Many have the desire to use the data - it's not just for engineers.

Q: **Russell Holt (Rhode Island DOT):** What was UDOTs biggest challenge with the transition to e-records/logs, and any input on how you overcame it? We have discussed (and want to) go there but haven't been able to do it yet.

A: Mark Taylor (Utah DOT): It's a great way of managing our electronic system. We just issued 275 electronic keys. There is no way you can manage that with a #2 key. At first, the techs were resistant – "why are we doing this, you're spying on me". But now they love it because know who is accessing the cabinet and what they were doing and understand more.

Q: **Isaac Alvarez (New Jersey DOT):** Do any signals you work with have preemption for [UTA Trax light rail](#)?

A: Mark Taylor (Utah DOT): Approximately, a quarter to a half have it. We're using both the older infrared systems, but we are also using connected vehicle technology using C-V2X radios.

ATSPMs for Everyone

Q: **Isaac Alvarez (New Jersey DOT):** Does WisDOT manage any signals in Milwaukee?

A: Joanna Bush (Mead and Hunt): Some signals within the City are DOT-owned, however, the majority are City-owned. The ramp terminals (where two state roads intersect) tend to be state-owned. The City of Milwaukee is number two in terms of the number of signals that one agency operates.

C: **Gang Xie (RTC of Southern Nevada):** This ATSPMs implementation map is not accurate about Nevada. The Las Vegas area is one of the first agencies to adopt the UDOT SPM system. Over 1,300 signals are in the system at http://challenger.nvfast.org

A: Lisa Miller (The Eastern Transportation Coalition): Joanna's map was from 2018. Sorry for any confusion.

C: Gang Xie (RTC of Southern Nevada): Thank you. We implemented the SPM back in 2015. Gradually adding signals that have comm. and Purdue Logger, from around 300 signals to 1,300 signals in the system now.

Q: **Lisa Miller (The Eastern Transportation Coalition):** You stated that a well-timed signal does you no good unless your detection is operating as expected. Tell me more about that.

A: Joanna Bush (Mead and Hunt): When your detection fails because it's stuck, including, a pedestrian button that puts in constant calls or a detector that isn't working, it tells the controller that there's a vehicle and/or pedestrian is there that isn't. While our well-timed signal provides these windows of opportunity to serve a phase, if it's serving phantom vehicles or phantom pedestrians, you're not serving the people that are physically present at the intersection to your highest efficiency. Before implementing ATSPM, WisDOT was relying on the public to be our indicator of whether something needed to be fixed in the field and they hadn't made it easy for the public. I was always amazed when they found a way to contact us. Once we had the ATSPMs I was shocked at how many failed detectors were operating in the field or were programmed wrong that we had overlooked.

Q: **Matthew Bonacci (Virginia DOT):** What security standards were developed for connecting your signals over resource share high-speed comms for ATSPMs?

A: Joanna Bush (Mead and Hunt): We did not have any resource sharing. Our communication was uniquely and specifically for the agency and signal communication.

A: Mark Taylor (Utah DOT): I don't understand the technicality of connecting the ITS infrastructure as it's done by a different team than mine. There are interlocal agreements in place with private telecommunication people. We will share strands of fiber with them, so we will split off fiber strands for private telecoms or they will do the same for us. We

barter and trade with them, so we may give them strands or conduit space and they may give us strands several hundred miles away somewhere else that we need to connect. We have our security measures in place.

C: Matthew Bonacci (Virginia DOT): Here in Virginia, we have been slowly moving forward due to resource-sharing comms. Our security division is very conservative, so it has led us to work with our consultants to develop policies and standards to just stand up ATSPMs. Hopefully a year from now we can be up and running statewide.

Adaptive to ATSPMs – A User's Guide

Q: **Matthew Bonacci (Virginia DOT):** In New Jersey, are you partnering with local signals too, or are these just state-maintained signals?

A: Kelly McVeigh (New Jersey DOT): We have state-maintained signals imported into our ATSPM platform. One thing that my management is very big on is sharing data resources with local agencies so that we have a seamless platform to offer to the public. Once the platform is more mature and our organization is built around it better, one of the first things we may do is reach out to local agencies and incorporate their data.

Q: **Lisa Miller (The Eastern Transportation Coalition):** Your ATSPMs are currently not public. Tell me about the steps are you working towards to make that public.

A: Kelly McVeigh (New Jersey DOT): Right now, our ATSPM platform is on a server that anyone inside the NJDOT network can access. We're still figuring out staffing requirements and the organizational structure of ATSPMs which is key to moving forward. This platform was born out of a research project, and the research team maintains it. The translator, for example, is a whole new piece of software. If it goes down, you wouldn't see any metrics. One of our next steps is to start pulling data from other signals that are currently connected to our fiber optic network.

Another key step is expanding the coverage. If you log into our system right now, you're going to see about 100 signals available. NJDOT owns about 2,600 signals.

Incorporating Energy and GHG into ATSPMs

Q: **Lisa Miller (The Eastern Transportation Coalition):**   How do you convey the most optimized options when it comes to excessive energy ATSPMs?

A: Stan Young (The Eastern Transportation Coalition): The research team is at the point of translating excessive energy measures into practical implementation. The excess energy measure is expected to correlate highly with arrival on red as well as delay. Initial correlation attempts produced unexpected results when intersections were closely spaced. In such cases, the intersection performance was 'coupled' – meaning the series of intersections needed to consider as a single functioning unit to understand performance. The coupled intersection issue was resolved by correlating excessive

energy measures at the corridor level, such that percent arrival on red and delay showed a strong correlation, and thus a path to the practical implementation of excessive energy measures.

Most everyone acknowledges that better-timed signals result in better energy efficiency. Now we're able to have more precise metrics on that relationship. Good traffic signal timing can minimize excess energy and its associated contribution to greenhouse gas emissions that may impact global warming, bringing additional justification to invest in improved traffic signal performance.

Q&A/Discussion

Q: **Jeremy Borden (Alabama DOT):** What is the benefit of sharing ATSPMs with the public? Seems like it invites a lot of unnecessary discussions and public signal experts.

A: Lisa Miller (The Eastern Transportation Coalition): Sharing ATSPMs with the public isn't just sharing with the public - there's a lot of power in telling your story to elected officials, your leadership, etc. Keeping ATSPMs within an engineering organization does no good when sharing stories about efficiencies.

A: Kelly McVeigh (New Jersey DOT): Mark had a great anecdote about the development staff who was pulling data for their project to understand volumes in the city. It could be a powerful tool for individuals outside of the traffic engineering field that we don't know at this time.

A: Joanna Bush (Mead and Hunt): From my perspective, there are also advantages to allowing your information to be public to neighboring agencies (if they are not part of your system) or consultants because it allows them to perform meaningful analysis of your signal or signal system's performance for other studies. For example, if they are looking at a TIA for a signal between some existing signals. They could see how the existing system is operating, what green bands are available, etc.; all without having to give you a call to request this information. I know WisDOT signal engineers were often providing information to lawyers regarding operations of the signal at the time of a crash or providing volume counts for other studies - it would reduce those calls and they could focus on their duties and not provide information to others.

A: Stan Young (The Eastern Transportation Coalition): Not to mention - telling a good story to your funders (public, state legislature, etc.) with defensible, objective information is a gold mine.

A: Mark Taylor (Utah DOT): One of the things that we are always reminded of by our director at UDOT is we are working for the public. Our revenue in government is how much the public trusts us. We try to be as transparent as we can and if there's any data that's not personal, we give it to the public.

A: Lisa Miller (The Eastern Transportation Coalition): Kelly, you mentioned it's important to know who's listening when you're telling your story. This isn't just inviting naysayers; there is a lot of power in telling your story.

C: Kelly McVeigh (New Jersey DOT): To be fair, New Jersey doesn't have experience with an outwardly facing ATSPM platform and communications with anybody who has access to it. As a thought - someone who's looking at this data and is going to understand it most likely we'll be helping us. Yes, someone could make it their life once they know this data is available and send many emails a day. Still, if that's the case I think it's helpful in the long term. I used to get phone calls about our systems before we had an arterial management center and people were very apologetic. I said don't apologize. If there's a problem, bring it to our attention. If they bring up something that's not a problem, you can use that as an opportunity to explain it's not an issue. That can help foster trust.
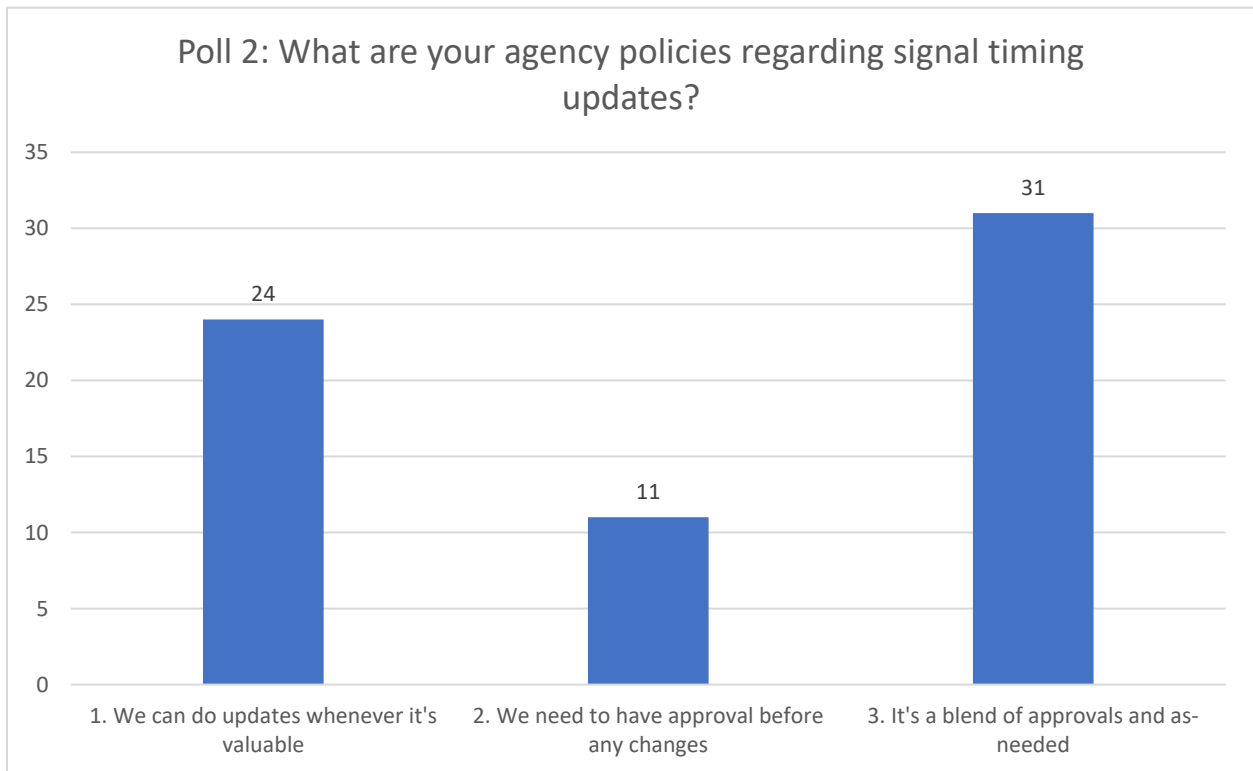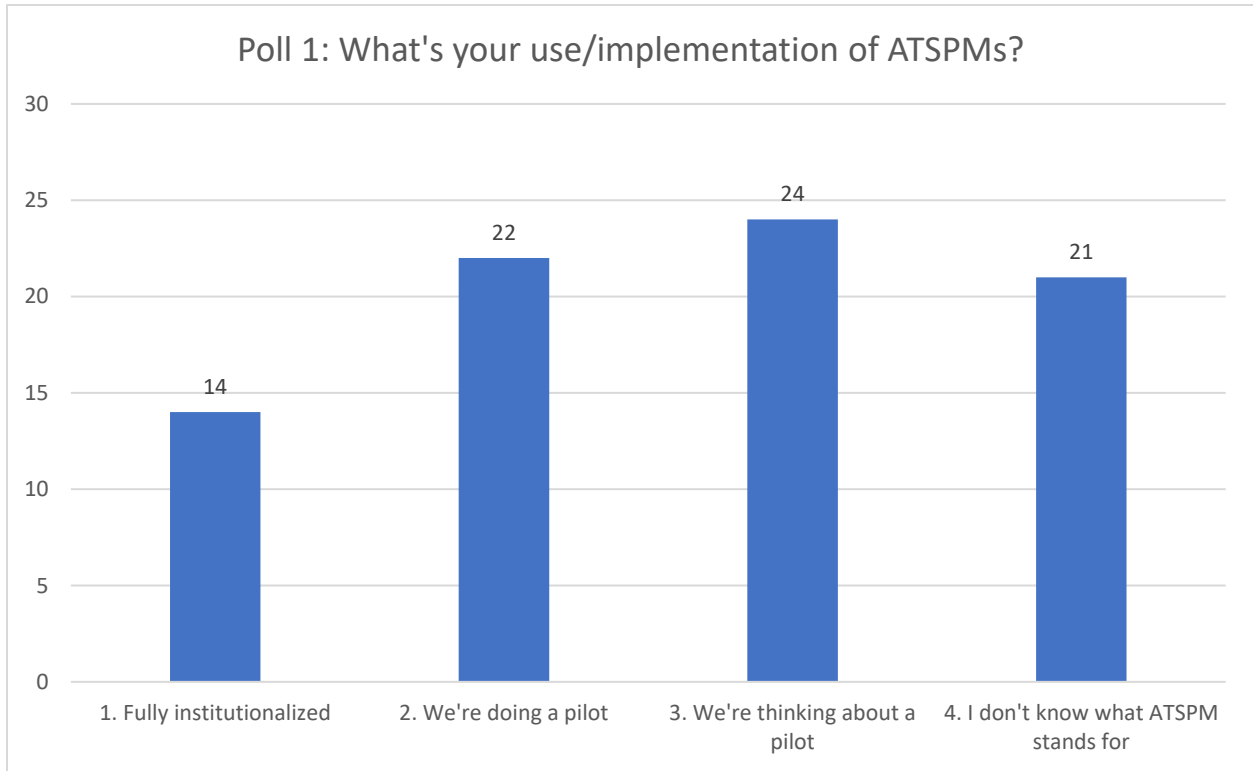
C: Lisa Miller (The Eastern Transportation Coalition): Joanna, you said it's not just the public; it's neighboring agencies and consultants. Mark has done so much work behind the scenes for years. Utah didn't just snap their fingers and have this fully implemented system with municipalities online. There was a lot of work behind the scenes. This is an opportunity to coordinate with your local partners as well.

A: Joanna Bush (Mead and Hunt): It's a time saver. As a public agency, it's your responsibility to provide this information if the public asks for it. Our signal engineers would spend a lot of time packaging crash information at signalized intersections. Instead, you can point the public to one place to get information. As Kelly said, in the end, everybody benefits from it. You're getting free services. Somebody is looking at your efficiencies without you having to spend time analyzing them.

A: Mark Taylor (Utah DOT): We are building tens of millions of dollars worth of infrastructure every year. We're doing this with traffic volumes that have been counted on a single day, then we apply a growth factor. How often do we get that wrong? Why not share data with everybody so they're able to make better-informed decisions?
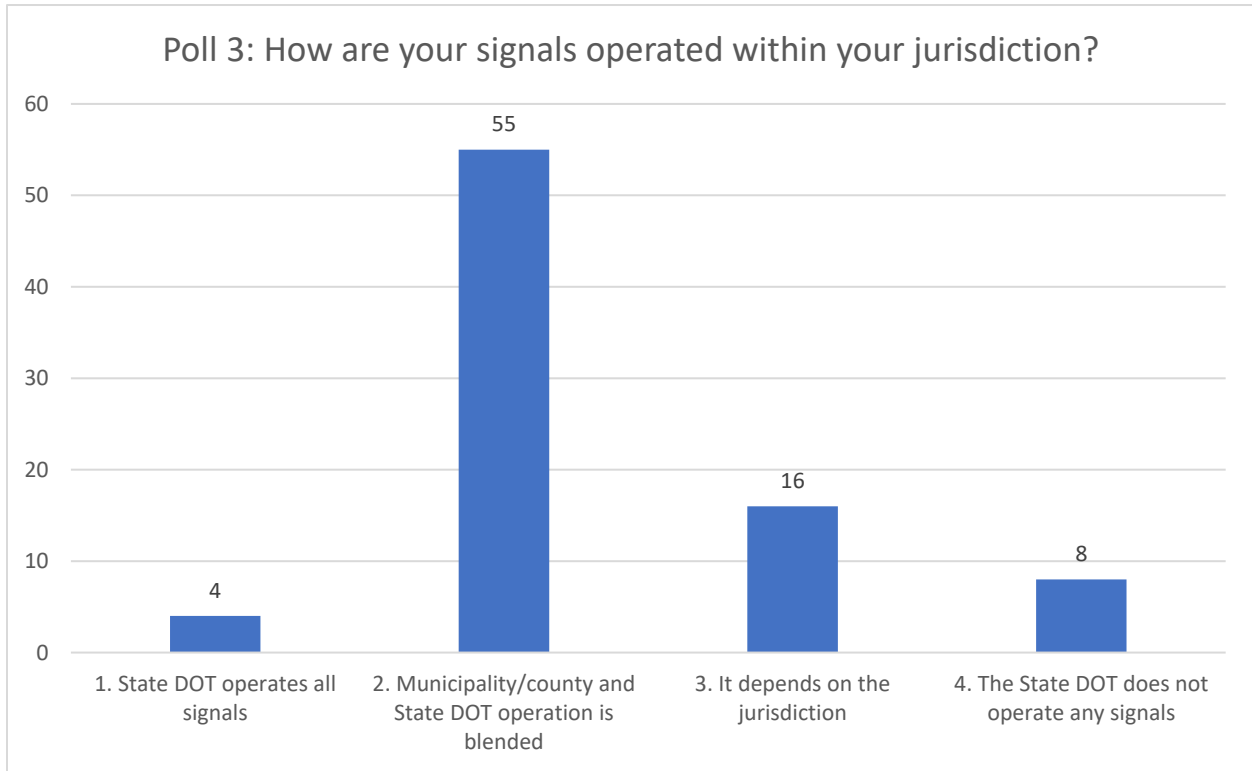
Poll 1: What's your use/implementation of ATSPMs?

Answer	Value
1. Fully institutionalized	14
2. We're doing a pilot	22
3. We're thinking about a pilot	24
4. I don't know what ATSPM stands for	21

Poll 2: What are your agency policies regarding signal timing updates?

Answer	Value
1. We can do updates whenever it's valuable	24
2. We need to have approval before any changes	11
3. It's a blend of approvals and as-needed	31

Poll 4: What is preventing you from using ATSPMs?	
Quality/consistency of detection and signal communications	Software
Quality of detection	Communications between different devices, IT equipment, agency systems, etc.
Lack of support from agency and higher-ups	Budget restrictions, cost of ongoing data analysis
Funding and staffing	Undecided on technology to use - controller specific vs agnostic
Network & Cyber Security	Hard to scale and keep extra detection channels straight. Missing roll-up summary tools. If detection fails, then ATSPMs may lack accuracy
Server Availability / Storage	Level of technicality