**The Eastern Transportation**
**New Signal Technology, New Maintenance Needs Webinar – November 4, 2021**
***Question and Answer Summary***

## New Signal Technology: Leveraging Data for Traffic Signal Performance (VDOT)

**Q:** **Christina Doughney (New York State DOT):** How are your signals communicating to connected vehicles? Were roadside units installed?

A: Michael Clements (Virginia DOT): We have two different pilots that are running in our northern Virginia area. We have one pilot, Virginia Connected Corridors, which includes 30 to 50 signals that are using roadside units and are managed by a research group. The one that I spoke of with the 1400 signals sending data to Audi vehicles and the Enlighten app, those aren't coming from roadside units. The data comes from the controller to our central signal system. Then with an API, we're streaming our data from the central signal system to a third-party developer who transmits the info to vehicles and the app through cellular connections.

**Q:** **Russell Holt (Rhode Island DOT):** Did the Virginia DOT traffic signal systems offices folks lead the way in getting approval to use cloud services (MS Azure) for ATSPM data, or was it more of a requirement or encouragement from IT-focused offices? Thanks, Michael, and great work in Virginia.

A: Michael Clements (Virginia DOT): There was about an extra year added into our central signal system and ATSPM deployment because of this issue of getting cloud services. The signal system group did not lead the way. Our IT folks did the heavy lifting there. In Virginia, we have a separate agency that handles IT for Virginia government agencies. Our Virginia DOT IT department worked with that IT agency to get approvals and contracts. It was a huge game-changer that came about in the middle of 2018. Our governor put out an Executive Order stating that we were moving away from buying servers and that everything is going to the cloud. Although we like the direction, we were pushed in that direction a little earlier than we were ready. But we let our IT lead it – and that was a good decision. The signals program just happened to be one of the first systems at Virginia DOT that's going to the cloud.

**Q:** **Eddie Curtis (Federal Highway Administration):** Keeping pace with the rapid emergence of technology related to ATSPM is challenging. How are agencies adapting their workforce, and business processes, and collaboration with partner agencies (towns and cities) to pivot towards the active operation of traffic signals; what's happening now, what needs are anticipated for the future?

A: Michael Clements (Virginia DOT): We only have about 120 signals on this signal performance metrics platform. We're also using the Utah DOT system. We're trying to build it as we're going. We're still testing it to see how much staff we need. It's a lot of data coming in. It's a lot of analytics that has to be done. While the ATSPM is automatically collecting the data, the analysis is still manual. An engineer/technician is still needed to look at and read the data. We've been through quite a bit of training on ATSPM including the different metrics you can get out of it and what they mean to us.

My team has been providing that training. We're also watching other states that are further along than we are to see what they are doing and what staffing and resource needs they are encountering based on the number of signals they operate. We hope to get to that level quickly.

**Q:** **Lisa Schletzbaum (Massachusetts DOT):** Is there a safety issue with the SPaT related slowdown of vehicles and the non-SPaT equipped "faster" cars?

A: Michael Clements (Virginia DOT): As far as I know we haven't seen a safety issue with it at this point. I don't believe enough vehicles are using it on the roadway system: right now it's only Audi vehicles that are 2018 or newer. In addition, it's only operating in a part of the state which is fairly congested and often does not see travel speeds at the posted speed limit. We haven't seen safety issues yet, however, that's a good research project for us to start looking at to see what effect the SPaT data has on safety.

**Q:** **Evarist Ruhazwe (Florida DOT):** What is your transition plan from DSRC to C-V2X units?

A: Michael Clements (Virginia DOT): I'm not involved with that at Virginia DOT directly. I believe we're testing both forms of SPaT data communication at this time.

**Q:** **Hazem El-Assar (Orange County, FL):** Did you upgrade your detection system to get ATSPM data?

A: Michael Clements (Virginia DOT): We have upgraded some of our detectors. We started with just the mentality of let's get ATSPM out there. There are quite a few metrics you can get without having great detection. We have pretty decent detection at most of our signals, but one of our next steps is to go through with the process of deploying better detection at key intersections. Where we have video detection you can do a lot more than you can where we have specific/limited loop detection in the pavement.

**Q:** **Evarist Ruhazwe (Florida DOT):** 1. Which software platform are you using for ATSPM? 2. How does ATSPM leverage for technicians' shortage (for maintenance purposes) at maintaining agencies?

A: Michael Clements (Virginia DOT): We are using the UDOT freeware.

I think like most states we do have a signal maintenance technician shortage; signal technicians are hard to come by sometimes. I do believe one of the side effects of ATSPM is going to be we will know a lot more about what equipment is failing at our signals and if we want to be proactive, we're going to need to get it fixed. This knowledge is going to lead to more maintenance. I think those two are going to play together - we have a staffing shortage and we're going to know about more needs than we have traditionally been aware of with limited monitoring capabilities.

**Q:** **Abiola Ajaka (Massachusetts DOT):** How does the SPAT system account for emergency vehicles and regular traffic at an intersection?

A: Michael Clements (Virginia DOT): Our central signal system and controllers know when they go into emergency vehicle preemption mode. That information is transmitted through that API to a third-party app.

**Q:** **Stan Young (The Eastern Transportation Coalition):** Are you dabbling in the 'Virtual ATSPMs' - that is ATSPMs from probe or connected vehicle data?

A: Michael Clements (Virginia DOT): We're not dabbling yet in the data coming in from vehicles. We're still considering the security implications of allowing data in. Right now, all Virginia DOT data goes out so we're not pulling data in from vehicles yet.

## The Evolution of GDOT Traffic Signals: From Regional Traffic Operations to SigOps

**Q:** **Russell Holt (Rhode Island DOT):** Collecting all that performance measures data from signals is great and impressive, but I assume there have been some challenges with actually using that data. Can you share anything more on such challenges, or is Georgia DOT's system so robust at this point that the actions and projects are advanced based on the performance measures?

A: Andrew Heath (Georgia DOT): I agree with that statement; translating data and dashboards into actions is easier said than done. We support those platforms with regular and routine meetings with our partners and with our consultant resources to drive accountability and action. When we're seeing information, the question is what are we doing about it. If we're not doing anything, why are we spending all this money to have these platforms and dashboards? That's a key piece of what we do. We have quarterly performance reporting meetings with all of our both in-house and consultant staff to talk through what we're seeing, doing, and anticipating moving forward to show how we're utilizing these systems and holding ourselves accountable for using those systems. Accountability is key and that's why we continue to go back and drive home those best practices internally through staff and externally through the industry, as well as to take advantage of our platforms.

C: Russell Holt (Rhode Island DOT): Great to hear. You have buy-in and accountability at high levels for TSMO, which sounds great.

**Q:** **Ginna Reeder (The Eastern Transportation Coalition):** How do you identify your three levels of signal priority? Can you talk a little bit about the process - specifically what data is used, whether the local jurisdictions were involved in identifying that? How does that relationship work?

A: Andrew Heath (Georgia DOT): It was several data sources that drove that decision-making process. A lot of history too – the original RTOP network was identified based on overarching traffic challenges, mobility safety challenges, and things of that nature. It was those types of data points that were leveraged to say okay these are vital, essential, or general. But then it was also coordination with local agencies and our district offices

out in the field where we talked through the issues that came up. Ultimately it was an iterative process. We would try new things, then make adjustments from there. The key part of that is that the system is designed to be flexible. For example, we are hosting the World Series Champion Braves Parade (on November 5) and it is happening up in Cobb County along a major arterial, which has quite a few arterials that feed into it. We've got to put a lot of focus on that specific network and specific system when we host the parade. Afterward, they return to their previous status. It's meant to be a flexible system. As we look at it, we've got to consider the top-line resources that we have available to make sure we work within those constraints.

**Q:** **Robert Cochrane (Virginia DOT):** Do you factor in your health metrics into your vital, essential, and general classifications to signals? Is the classification mostly for maintenance or for engineering too?

A: Andrew Heath (Georgia DOT): The health metrics are tied into all of the traffic signals included within our active management umbrella. The difference between classifications may result in different performance targets within the index.

**Q:** **John Gregg (Massachusetts DOT):** Is the signal maintenance performed by contractors only or do you have in-house electricians/technicians that also do the same?

A: Andrew Heath (Georgia DOT): It's both. For states, hiring and retaining technicians has continued to be a challenge, but we do have that capability across our districts. We've seen continued reliance on our contractors, primarily when we're in emergencies such as a hurricane, things of that nature; we rely very heavily on our on-call maintenance contractors. That's why we wanted to build those contracts to be as quick and responsive as we could, with predefined prices for various activities. It's worked well for us in doing it that way.

**Q:** **Neil Boudreau (Massachusetts DOT):** We are working on contracts to outfit all of the signals within a district region with comms to add the performance measurement capabilities, but the question we are asking is who is going to use the information and if we look to hire someone, what job duties would we want? Do you have anyone assigned to do this work in the central office or is it specific to your regions?

A: Andrew Heath (Georgia DOT): We don't have specific positions within our office to do that. That became another line item for the continued evolution and growth of our traffic engineers. It’s a continuing adjustment in the business process. We've had varying levels of success. For example, we have some traffic engineers that if we want to implement a plan, they won't do so until they've been in the field to check, validate, and do it the traditional way. We also have several engineers that dove headfirst into data and technology; they make a big difference from their desks. It's a work in progress and I think that we continue to evolve. The main thing is continuing to press and push that accountability factor because that's how you influence your business process. It becomes your core tool to manage your system because it's there for that reason. That's been our approach; we don’t have a silver bullet for doing it. I don't know if just

hiring someone to take advantage of that is necessarily the answer but I think it can certainly help to have a champion in doing that. It's saying this is the way we're going and let's continue to push that way.

**Q:** **Stan Young (The Eastern Transportation Coalition):** I love the name 'SigOps', sounds sophisticated (which it is), similar to a National Intel Agency directorate. Similar question, is Georgia dabbling in 'Virtual ATSPMs' from probe data or CV data for lower priority signals?

A: Andrew Heath (Georgia DOT): We worked with our communications department and a marketing group to come up with that name. That was a fascinating activity - understanding font types and colors that are specifically picked out and why. When we rolled that out, staff thought that was the coolest thing ever to see is “powered by Georgia DOT”. It gives credence to this program.

From a virtual ATSPM perspective, I don't know if I would say that we're doing that. From a connected vehicle perspective, we are starting to pull data in at various locations through onboard units attached to the can bus of vehicles. We're starting to get into that world. That's been a challenge from a security perspective with our IT folks. We are standing up a Statewide Travel Management System (STMS) to help address some of the security issues. One of the things that we're doing along those lines is we are outfitting all of our safety service patrol (HERO) here in Georgia with onboard units to communicate to our infrastructure as part of a grant award that we received through the Advanced Transportation and Congestion Management Technologies Deployment (ATCMTD) program. As part of that project, Georgia Tech will be running a digital twin from that connected vehicle data to see what is happening from an operations perspective using the HERO connected vehicle data as its source. I'm not sure if that's necessarily virtual ATSPM. I think it kind of speaks to that concept. The way we're referring it to is essentially a digital twin of the signal system at that specific location where we're introducing the project.

## Regional Traffic Operations (RTOP)

**Q:** **Christina Doughney (New York State DOT):** What platform/provider do you use for probe data and how do you use it, what types of projects and analysis?

A: Brett Sellers (Alabama DOT): We use HERE for our probe data. They have partnered with Iteris for our performance metrics known as ClearGuide. We use HERE in everything that we do – they are integrated into our ATMS and our TMC. We use the ClearGuide platform a lot including building our TSMO Capital Program, specifically when we went to seek money for that program. We have not used it as much in our RTOP for travel times. We've utilized it more for presentations and illustrating the beginning and ending benefits, similar to Tuscaloosa and much more, such as a long-

duration incident. But it's a business process that we're trying to get incorporated and sell the use of that tool.

**Q:** **Russell Holt (Rhode Island DOT):** Regarding “Securing a statewide single software system": did you say Alabama DOT is looking to use just one vendor's software or instead is it anticipating to have to use a few different vendors (to accommodate multiple signal controller manufacturers)? If Alabama DOT uses just one controller manufacturer, this is a moot point (and I'd say you have it a little easier).

A: Brett Sellers (Alabama DOT): The plan as of right now is to transition to a single software solution. This will be a phased approach in knowing for us to reach full product capability equipment upgrades will be needed. We will continue to operate multiple systems for an undetermined time until that goal can be reached.