BEST USE OF MANAGEMENT OF DATA TO IMPROVE TSMO IN GEORGIA

By: Georgia Department of Transportation (GDOT)

IN THIS CASE STUDY YOU WILL LEARN:

1. How GDOT’s Measurement, Accuracy, and Reliability Kit (MARK 1) automated a manual reporting system for a Regional Traffic Operations Program.
2. How GDOT saved hundreds of hours in development each month and approximately $250,000 in annual savings.
3. Continuing partnerships with other state agencies, like the Utah Department of Transportation (UDOT), have led to additional insights and metrics being developed.

BACKGROUND

Automated Traffic Signal Performance Measures (ATSPMs) started in 2005 when the Indiana Department of Transportation (INDOT) initiated research with Purdue University to develop performance measures that characterized flow rates, quality of coordination, and split failures using logged time-stamped detectors, phase changes, and controller events. During the development of these performance measures, the research team reached out to agency partners and vendors (Econolite, Siemens, and Peek) to develop a library of definitions for controller events as discussed above. This research resulted in a host of new performance measures that could be produced once all the vendors were talking with the same language, called the Indiana Traffic Signal High Resolution Data Logger Enumerations, keeping the development of ATSPMs vendor neutral.

The Utah Department of Transportation (UDOT) developed a web-based application that used this data to produce performance measures. In 2014, UDOT led an American Association of State Highway and Transportation Officials Innovation Initiative (AASHTO AII) on ATSPM that helps to identify and champion the implementation and deployment of proven technologies, products or processes that are likely to yield significant economic or qualitative benefits to the users. UDOT led this effort with assistance from Purdue University, INDOT, Minnesota DOT (MNDOT), and the Federal Highway Administration (FHWA). Beginning in 2015 the Georgia Department of Transportation (GDOT) launched its own instance of ATSPM, with the assistance of UDOT, providing free access to advanced corridor and signal metrics to engineers across the state. As of August 2019, over 6,500 traffic signals in Georgia provide this real-time data.

TSMO PLANNING, STRATEGY, AND DEPLOYMENT

In 2017, GDOT retained Kimley-Horn to further develop ATSPM as well as consolidate the controller event data and vehicle probe data into corridor-wide performance measures for monthly and quarterly trends for each Regional Traffic Operations Program (RTOP) corridor. Launched in January 2018, GDOT’s Measurement, Accuracy, and Reliability Kit (MARK 1) automated a manual reporting system for RTOP that had been in place for over five years, saving hundreds of hours in development each month and approximately $250,000 in annual savings. The public facing website allows engineers to...
track trends on an intersection, corridor, and programmatic level as well as visualize maintenance related problems. Since its initial deployment the site has continued to expand to include corridors across the state and additional data visualization metrics. Following UDOT’s example, GDOT has made the source code for this tool freely available to other agencies for use.

The ATSPM and MARK 1 project has allowed practitioners to bring back traffic signal data in near real-time so they can do more with less, focus resources on the areas of most need, and more effectively prioritize resources and workload. The ATSPMs shown allows everyone (if desired) access to data and has substantially increased full situational awareness of the transportation system using large amounts of “big data.”

COMMUNICATIONS

Implementation of both ATSPM and MARK 1 within the agency and with local and consultant partners took a tremendous amount of work. The concept of ATSPM and related data tools were such a paradigm shift in how traffic signals are maintained, managed, and operated, that there was significant pushback to a different way of doing things. Through targeted efforts in trainings, presentations at local professional organizations and national conferences, and working directly with all of the stakeholders, GDOT worked diligently to educate and inform their partners on the power that the suite of tools would bring to their maintenance and operations. Additionally, the amount of outreach and coordination with partners allowed GDOT to receive quality feedback from industry partners on how to improve the systems that were being implemented.

Once the applications began to provide real, tangible examples for improvement, buy-in to the ideas and concepts accelerated and truly began a culture shift. Data and analytics tools used for arterial operations and maintenance are taking root in Georgia.

OUTCOME, BENEFITS, AND LEARNINGS

The deployment of these applications is saving hundreds of hours in development each month and approximately $250,000 in annual savings. Additional savings are realized on other projects and programs through using data to eliminate unnecessary or redundant workflows. Operational issues are resolved remotely and more quickly through the use of data tools, alleviating the need for costly and slow field evaluations. Additionally, the performance monitoring of the system is automated, giving a 24/7 overview of performance in near real-time, as opposed to snapshots based on floating car studies.

The activation of the technology and the corridor level metrics have enabled GDOT to better focus limited resources to where problems and issues are in the field. Timing issues are better addressed and more efficiently remotely resolved, and proactive response to operational and maintenance issues is dramatically enhanced. Response to customer complaints has become instantaneous, enabling better communications to the public when issues arise.

Continuing partnerships with other state agencies, like UDOT, have led to additional insights and metrics being developed. GDOT will soon be deploying its first new signal performance metric, which helps measure available left-turn gaps for permissive left-turn movements. The development of the metric was done in close coordination with UDOT.

GDOT’s ATSPM website has over 475 active users each month, with over 77,000 individual metrics pulled since January 1, 2019 (as of 10/11/2019).

FURTHER INFORMATION

NOCoE Knowledge Center: https://transportationops.org/knowledge-center
AASHTO ATSPM Website: http://aii.transportation.org/Pages/AutomatedTrafficSignalPerformanceMeasures.aspx
GDOT ATSPM Website: https://traffic.dot.ga.gov/ATSPM/Home/About