National Capital Region
Transportation Planning Board

MEMORANDUM

TO: Systems Performance, Operations, and Technology Subcommittee (SPOTS)
FROM: Andrew Burke, TPB Transportation Engineer
SUBJECT: 2022 SPOTS Member Technology Questionnaire
DATE: September 8, 2022

The state of transportation technology changes at a rapid pace. With these rapid changes in mind, TPB staff surveyed staff persons from member agencies to find out what new/recent technologies they may be employing and to share this information with other members. This will highlight what is currently being employed and help inform future decisions in technology deployment. This questionnaire succeeds the Traffic Signal Surveys that were previously performed biennially by TPB staff.

Information was gathered on the use, deployment, and enhancement of transportation technology that would be of interest to our members in the region. These deployments cover the gamut of planning/operations areas. Traffic signals have become more than just traffic control devices as technology has increased their use in not only detection but counting and classification as well. UAV use in the region has increased with the formation of the Maryland State Police Traffic Incident Management units that use drones in accident reconstruction. Across the region technology is changing the way agencies and jurisdictions perform their duties, and the sharing of information will help in the deployment of technology that enhances all aspects of transportation in the TPB region.

Respondents were asked to provide information on projects using new technologies. Technology not currently deployed but in the planning stages are also included. Responses are advisory only, for use in planning future SPOTS activities, and are not meant to be a comprehensive inventory on a per-agency basis. A sampling of the information from collected responses follows below.

TRAFFIC SIGNAL SYSTEMS

DDOT - Transit Signal Priority - Phase 2 - After the initial regional TSP deployment led by MWCOG, DDOT worked with WMATA and conducted several rounds of evaluation of the existing system and relocated the TSP equipment at 40 intersections early this year from less effective locations to the locations with high potential. New queue-jumping signals will be added through this effort to enhance the bus priority throughout the city.

DDOT - Citywide Signal Optimization Program - which provides an on-going and proactive service to residents, businesses, and operations by continuously updating and enhancing traffic signal operations and timings at the District's 1,600+ signalized intersections. As the District's infrastructure is constantly evolving in terms of private development (e.g. Capitol Crossing, Skyland), public infrastructure changes (e.g. streetscapes, bridge replacements), and multi-modal enhancements (e.g. 16th Street Bus Lanes, Irving Street Cycle Track), this program provides a mechanism for DDOT to update signal timings in coordination with these changes and the

associated changes in travel patterns. Since DDOT has consistently invested in this program over the past decade they have been able to reach a point where they are not just maintaining the system at a high level, but also adding new state of the practice features and enhancements on a regular basis. For instance, DDOT has increased the number of Leading Pedestrian Intervals (LPIs) in the District from just under 200 at the end of 2017 to nearly 1,100 by the end of 2021. This program ensures that DDOT can continue to deliver these LPIs and other critical enhancements that DDOT's customers expect.

MDOT/SHA – Signal Phase and Timing (SPaT) Project - In April 2022, MDOT finalized deployment of the 20 SPaT intersections on US 1 and MD 175. The goal of this specific deployment is to promote safety, with the larger ambition of working toward state-wide integration of CV technologies. It is a first step on the road to CAVs becoming more common on roadways and lessons learned from this project will inform future work.

MDOT/SHA – OTMO/TSMO – The Office of Transportation Mobility and Operations (OTMO) is gradually making inroads into signal operations. One of the goals of our TSMO was to do more to operate freeways and parallel arterials as systems. MDOT is gradually upgrading signal communications, surveillance along arterials, adding staff, developing incident timing plans and integrating functions into the SOC ATMS. Eventually SOC will detect an incident and based on the location, time and severity of the incident the system will implement a timing plan on the arterial.

VDOT - Central Signal System (KITS) - The Virginia Information Technologies Agency (VITA), on behalf of the Virginia Department of Transportation (VDOT), selected Kimley-Horn to provide our KITS Smart City Software Solution for all VDOT-operated signalized intersections across the state.

VDOT - Automated Traffic Signal Performance Measures (ATSPM) Statewide Rollout - Provides real-time performance data from traffic signals that will lead to improved signal performance. Traditionally, signal timing parameters are optimized and then left in place until being optimized again for updated conditions. This results in declining performance and lost efficiency in the system. With ATSPM, declining performance is seen right away and can be addressed. The goal is that ATSPM will be deployed in 80% of the VDOT signals across the Commonwealth by the end of 2022.

CONNECTED AND AUTOMATED VEHICLES

MDOT - CAV Activities in 2021 - in 2021 MDOT and MDP released the CAV Toolkit for Local Jurisdictions to help local jurisdictions understand the breadth of potential impacts of CAV. CAV has now been incorporated into recurring and long-range Maryland plans, including the Freight Plan, State Agency Report, Consolidated Transportation Plan, Statewide Transit Plan and Strategic Highway Safety Plan. Two legislative bills passed in 2021 and are now active: truck platooning and personal delivery devices (PDD). The Maryland AV Impacts Law Review by University of Baltimore was initiated. Maryland now has over 40 connected vehicle roadside units across three infrastructure owner operators (MDOT SHA, Montgomery County DOT, Prince George's DPW&T) broadcasting signal phase and timing, pedestrian warning, MAP messages, traveler and/or information messages over a mix of DSRC and LTE C-V2X radio technology.

VDOT - CAV Readiness Project - Assessed VDOT readiness for CAVs across four dimensions: Infrastructure, People, Processes, and Tech; Identified 15 use cases that will most likely impact the Commonwealth in the near to midterm; Developed 24 investments VDOT should make to support these use cases and continue to improve VDOT readiness for CAVs.

VDOT - CAV Data Mapping Project – The CAV Systems Mapping Project will identify internal and external CAV data needs for VDOT. It will also identify what CAV data is available for VDOT to consume and what systems within VDOT should consume CAV data. Are current VDOT systems capable of ingesting, analyzing, and sharing CAV data will also be explored. What VDOT data is needed by CAVs and which systems within VDOT can provide the data will also be studied. A vendor has been selected and work is expected to begin soon on this project.

ELECTRIC VEHICLES

DDOT - The District Electric Vehicle Infrastructure Deployment Plan - As part of the requirements for the new federal formula program, National Electric Vehicle Infrastructure Formula Program, the District is required to develop a plan for EV infrastructure deployment. To receive funds, DDOT needed to submit an EV infrastructure Deployment Plan by August 1, 2022, to FHWA describing our goals and how we intend to use our NEVI funds. Our deployment plan will contain sections on charging infrastructure deployment, existing and future conditions, contracting, implementation, program evaluation, documentation of state agency coordination, stakeholder outreach, and most importantly, public engagement and equity. Overall, our plan will address connectivity and the deployment of EV charging placement along with the interstate system, alternative fuel corridors (AFCs), and equitable station placement across all Wards.

OTHER

NVTA Transportation Technology Strategic Plan (TTSP) - Consists of eight strategies and an Action Plan, which were designed to proactively prepare for the use of evolving technologies to address travel demand on infrastructure, while keeping congestion reduction top of mind. The full TTSP is maintained as a living document, and NVTA staff will continue to provide regular updates on progress through the NVTA Chief Executive Officer's monthly report to the Authority.

VDOT - Regional Multimodal Mobility Program (RM3P) - The RM3P is a collaborative program to improve safety, reliability, and mobility for travelers in the Northern Virginia (aka. Northern Tier) and Metropolitan Fredericksburg (aka. Southern Tier) region. Through the RM3P initiative, public and private sector transportation safety and service providers across the two tiers will adopt technologies to improve multi-modal travel conditions. The RM3P includes four sets of technologies, including Dynamic Incentivization, which "will be a data-driven system offering the public incentives to modify their travel choices and behaviors in response to real-time travel conditions. The incentives will be offered by regional agencies and third-party providers."

Arlington County - Glebe Road, Lee Highway, Washington Blvd., and Crystal City/Pentagon City ITS Improvements - The Intelligent Transportation Systems (ITS) program leverages new technologies to improve traffic operations and monitoring capabilities for all modes of travel throughout the County. The focus of the program will shift from infrastructure construction to better integrating the various

systems to improve safety and capacity. County ITS can improve transparency and provide valuable information to partner agencies such as VDOT.

DDOT - Waze Beacons - DDOT has recently installed and activated Waze Beacons in the National Mall tunnels (3rd Street, 9th Street, and 12th Street). The Waze Beacons are installed in tunnels where GPS signal is lost. The Beacon is a battery-operated, low-energy micro-controller hardware that sends a one-way signal to a user's phone or tablet without capturing any information about the user. The signal from each Beacon enables Waze to continue routing drivers and collecting real-time traffic data underground. Other navigation apps can also use the Waze Beacons program technology for free.

DDOT - WIM Notice of Infraction – DDOT plans to start sending Weigh-in-Motion Notice of Infractions (based on current MDSHA practice) to carriers who are frequently overweight.

CONCLUSION

Technology is ever evolving and offers possibilities to TPB member agencies that include increased efficiency, lowering of costs, and improved data for decision makers. This list of projects is by no means comprehensive but just a snapshot from SPOTS members, projects that are taking place across the National Capital Region using new technology. TPB staff intend to continue focusing on the types and applications of technologies and share that with other members so all may benefit from others' experiences.