



Connected and automated vehicles

Technology, research, planning and integration

The dizzying pace of technological innovation with respect to connected vehicles (CV) requires owners and operators of roadway infrastructure to adopt policies and technology to accommodate the vehicles of the future. WSP USA partners with state and local transportation agencies to develop roadmaps for CV deployment, prepare their digital infrastructure for this connected future, and develop and implement pilot deployments.

In order to plan for the future and be prepared for what's next, our firm helps agencies address the following considerations:

- How can we cost-effectively integrate CV technology into our infrastructure in a way that advances our agency's goals?
- How can we invest in CV technology that minimizes the risk of technology obsolescence?
- How can we make use of the large amounts of data now available to our agency due to CV technology?

Our services

STRATEGIC PLANNING AND ORGANIZATIONAL CHANGE MANAGEMENT

WSP is a national leader in helping guide transportation agencies through periods of change, most recently through our work in implementing the principles of transportation systems management & operations (TSM&O). We adapted the capability maturity model to TSM&O concepts, and developed an online tool for system operations and management under contract to the Federal Highway Administration and the American Association of State Highway and Transportation Officials. We are positioned to incorporate connected and automated vehicle (C/AV) components into our existing TSM&O efforts for our clients.

TECHNOLOGY DEPLOYMENT AND INTEGRATION

We support transportation agencies with the planning, design, deployment and integration of CV technologies, including:

- **Roadside Infrastructure:** We advise on the design and installation of dedicated short-range communications (DSRC) roadside infrastructure and work with vendors and telecommunications specialists to implement DSRC networks.
- **Telecommunications Expertise:** We offer telecommunications expertise in support of DSRC backhaul infrastructure as well as for other C/AV applications that require a telecommunications backbone.
- **Vehicle-to-Infrastructure (V2I) Applications:** We enable messaging capabilities and data integration to support V2I applications, such as traffic signal-based messaging and integration with transit service applications.
- **Data Management, Warehousing and Integration:** We help manage large volumes of data from CVs and translate that data into usable information for transportation management centers and/or agency-specific applications.
- **Asset and Configuration Management:** We assist in deploying emerging technologies while being mindful of performance management tracking, ensuring that equipment functions as planned and can be expanded as needed.

Our experience

U.S. DEPARTMENT OF TRANSPORTATION (USDOT) CONNECTED VEHICLE SAFETY PILOT

Our firm was the infrastructure lead for the largest demonstration in the U.S. of the validity of V2I communication—the USDOT's Connected Vehicle Safety Pilot Program. As infrastructure team lead, we provided planning, design, integration and testing of all the roadside and back-end communications elements of this project and managed overall installation, operations and maintenance of the system. This included design and delivery of a network of roadside installations, next-generation signal controllers capable of broadcasting signal phase and timing information, and a backhaul communications network to facilitate data exchange and archiving. The scope of the project was expanded and the program renewed for three years as the Ann Arbor Connected Vehicle Test Environment, with our firm continuing as infrastructure lead.

SMART COLUMBUS

After supporting the city of Columbus, Ohio's successful bid for the USDOT's Smart City Challenge, we continue to provide critical expertise to the planning, design and deployment of Smart Columbus. We are leading the systems engineering and design activities for both the CV and automated vehicle (AV) projects within the city. The planned CV elements include an expanded Columbus Connected Transportation Network/ Smart Corridors that includes 175 DSRC roadside units. Specific to AVs, the city's plan includes deployment of a fleet of six CV-enabled fully autonomous electric vehicles (EAVs), planned for use on public roadways and intended to solve first- and last-mile challenges. In conjunction with these EAVs, the AV solution also includes the deployment of wireless inductive charging technologies.

AMERICAN CENTER FOR MOBILITY C/AV TEST CENTER

Our firm is leading the planning, design and deployment of technology systems required by the American Center for Mobility (ACM) at Willow Run, a new connected and automated vehicle test site facility in Southeast Michigan. One of ten nationally designed AV Proving Grounds, ACM will be built on more than 335 acres adjacent to Willow Run Airport

in Ypsilanti, and will serve as an advanced automotive testing and product development center that can accommodate the broad needs of industry and government. The project includes accommodations for DSRC roadside units, a 5G cellular test bed, configurable lighting and traffic signal systems, and monitoring infrastructure throughout the test site.

MICHIGAN DEPARTMENT OF TRANSPORTATION (MDOT) CV STRATEGIC DEPLOYMENT PLAN

As part of a CV on-call services agreement, MDOT commissioned WSP to develop a strategic deployment plan for CV systems and infrastructure in the Detroit region. The plan includes a multi-element strategy, which lays the foundation for broad CV deployment while accelerating benefits using mobile technologies and a range of private-sector partnerships. It also outlines focus V2I applications, which MDOT seeks to help industry partners develop in anticipation of broad deployment of DSRC technology.

SOMERVILLE TRAFFIC SIGNAL UPGRADES

Our firm is serving as the project manager and lead consultant for a project in Somerville, Massachusetts's Union Square neighborhood. The project includes the installation of traffic signal upgrades that will support the USDOT's approach to CV technology and will allow automakers to offer an innovative in-vehicle experience for their customers. German car manufacturer, Audi, is testing its new traffic light information system using the technology that is being installed at Union Square. Technology built into certain Audi models is able to receive signal phase and timing data from the traffic signal system. By using proprietary software, it predicts how much time is remaining for the green light to turn red—or conversely the red light to green. This information is then conveyed to the driver as they approach the intersection, ultimately improving traffic flow and fuel economy as drivers adjust their driving styles based on the information. The same infrastructure equipment that supports this early Audi initiative can also be easily expanded to support the USDOT's V2I CV concepts, providing this same signal phase and timing data to all CV-equipped vehicles. The three traffic signals in Union Square will support this technology and become permanent fixtures at these intersections.

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