Current CAV Initiatives/Efforts in Wisconsin

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Foundational Assets in Wisconsin for CV

- ITS Infrastructure
- Owned and Leased ITSNET Fiber Network
- Improvements to ITSNET Network Reliability
- Updated traffic signal controller spec in 2017 capable of supporting SPaT and MAP for CV integration
- Statewide Traffic Management Center with 24/7/365 Operation

Bureau of Traffic Ops (BTO) National Engagement

- CV Pooled Fund Study Member State Since 2013
- ENTERPRISE Pooled Fund Study Member State 2019
- National Committee on Uniform Traffic Control Devices (NCUTCD) Connected and Automated Vehicle (CAV) Task Force
- National Cooperative Highway Research Program (NCHRP) Project Panels
- AASHTO Committee on Transportation System Operations Working Group on Connected and Automated Vehicles
- V2I Deployment Coalition/ CAT Coalition Meetings

BTO DSRC Pilot

Phase 1

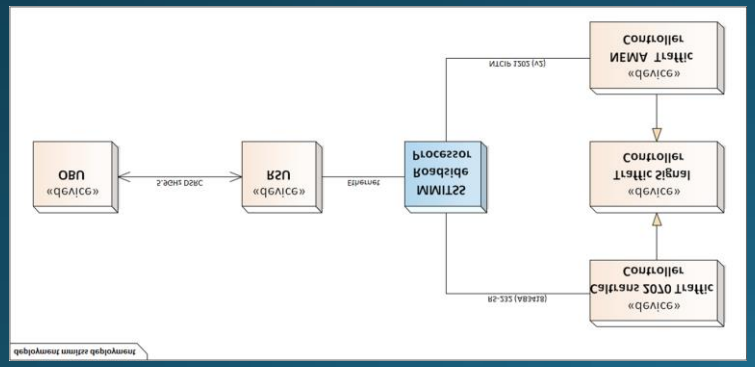
- Demonstrate hardware and software functionality in a laboratory setting within WisDOT's existing operational environment.
- Hardware
  - Siemens Roadside Unit (RSU)
  - Sirius Onboard Unit (OBU)
  - TrafficCast RSU
  - Denso OBU
- Software
  - V2I Hub software for SPaT and MAP
  - TransSmart BSM Data Collector
  - Traffic Cast TIM Software

Phase 2

- Demonstrate hardware functionality and integration in a field setting within WisDOT's operational environment.
- SPaT Challenge
- Connected Fleet Challenge

MMITSS Deployment in City of Madison

- Multi Modal Intelligent Traffic Signal System
- WisDOT BTO is collaborating with the City of Madison for the Connected Vehicle Pooled Fund Study (CV PFS) MMITSS project
- The City to receive technical assistance from U of AZ to deploy MMITSS applications on the Park Street Corridor.

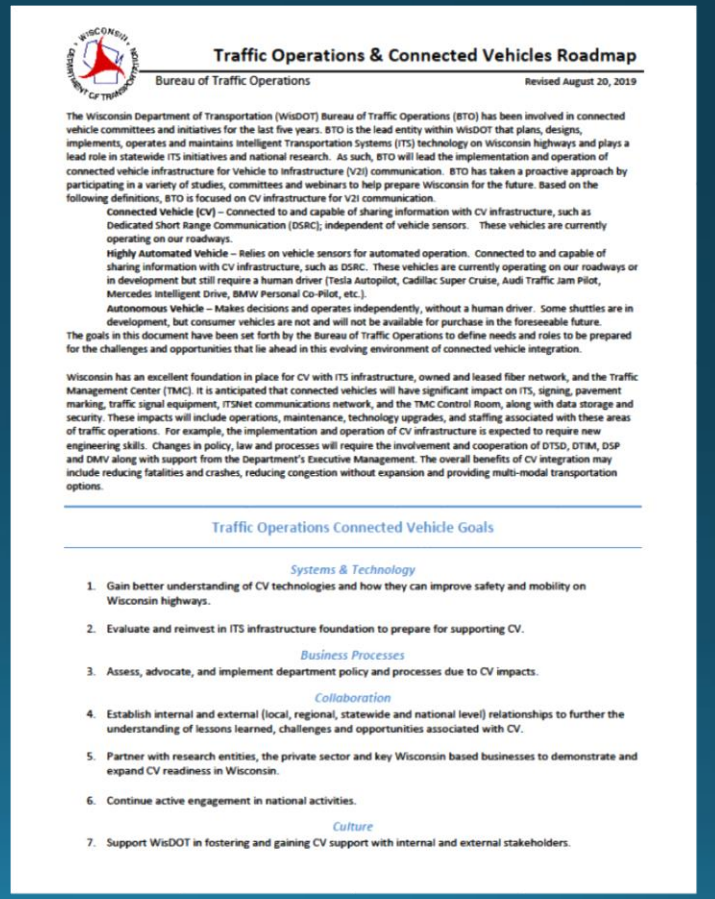


Work Zone Connected Technology Test

- WisDOT BTO purchased two iPins™ and two adaption kits for Connectedtech™ arrow boards from iCone® Products LLC.
- iPins™ can be inserted into a traffic control device to send GPS location information.
- WisDOT will be testing and investigating potential uses of this real time information for the ATMS and 511 systems.

BTO Developed CV Roadmap

- Roadmap goals and objectives aligned with the dimensions of the SHRP2 L01 & L06 TSM&O Capability Maturity Model



Traffic Operations & Connected Vehicles Roadmap

Bureau of Traffic Operations — Revised August 20, 2019

The Wisconsin Department of Transportation (WisDOT) Bureau of Traffic Operations (BTO) has been involved in connected vehicle committees and initiatives for the last five years. BTO is the lead entity within WisDOT that plans, designs, implements, operates and maintains Intelligent Transportation Systems (ITS) technology on Wisconsin highways and plays a lead role in statewide ITS initiatives and national research. As such, BTO will lead the implementation and operation of connected vehicle infrastructure for Vehicle to Infrastructure (V2I) communication. BTO has taken a proactive approach by participating in a variety of studies, committees and webinars to help prepare Wisconsin for the future. Based on the following definitions, BTO is focused on CV infrastructure for V2I communication.

Connected Vehicle (CV) – Connected to and capable of sharing information with CV infrastructure, such as Dedicated Short Range Communication (DSRC); independent of vehicle sensors. These vehicles are currently operating on our roadways.

Highly Automated Vehicle – Relies on vehicle sensors for automated operation. Connected to and capable of sharing information with CV infrastructure, such as DSRC. These vehicles are currently operating on our roadways or in development but still require a human driver (Tesla Autopilot, Cadillac Super Cruise, Audi Traffic Jam Pilot, Mercedes Intelligent Drive, BMW Personal Co-Pilot, etc.).

Autonomous Vehicle – Makes decisions and operates independently, without a human driver. Some shuttles are in development, but consumer vehicles are not and will not be available for purchase in the foreseeable future.

The goals in this document have been set forth by the Bureau of Traffic Operations to define needs and roles to be prepared for the challenges and opportunities that lie ahead in this evolving environment of connected vehicle integration.

Wisconsin has an excellent foundation in place for CV with ITS infrastructure, owned and leased fiber network, and the Traffic Management Center (TMC). It is anticipated that connected vehicles will have significant impact on ITS, signing, pavement marking, traffic signal equipment, ITSNet communications network, and the TMC Control Room, along with data storage and security. These impacts will include operations, maintenance, technology upgrades, and staffing associated with these areas of traffic operations. For example, the implementation and operation of CV infrastructure is expected to require new engineering skills. Changes in policy, law and processes will require the involvement and cooperation of DTSD, DTIM, DSP and DMV along with support from the Department's Executive Management. The overall benefits of CV integration may include reducing fatalities and crashes, reducing congestion without expansion and providing multi-modal transportation options.

Traffic Operations Connected Vehicle Goals

Systems & Technology

1. Gain better understanding of CV technologies and how they can improve safety and mobility on Wisconsin highways.
2. Evaluate and reinvest in ITS infrastructure foundation to prepare for supporting CV.

Business Processes

3. Assess, advocate, and implement department policy and processes due to CV impacts.

Collaboration

4. Establish internal and external (local, regional, statewide and national level) relationships to further the understanding of lessons learned, challenges and opportunities associated with CV.
5. Partner with research entities, the private sector and key Wisconsin based businesses to demonstrate and expand CV readiness in Wisconsin.
6. Continue active engagement in national activities.

Culture

7. Support WisDOT in fostering and gaining CV support with internal and external stakeholders.

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BTO Initiatives to Support and Enhance Connected Vehicles

Pilots	Planning	Architecture	Data Mgmt	Partnerships
Identify other V2I piloting opportunities including demonstrating software and application integration.	Update the ITS planning process to be nimble and support implementing CV technologies.	Update ITS architecture to include Connected Vehicle Reference Implementation Architecture (CVRIA) applications.	Identify data management and governance challenges pertaining to CV technology.	Identify strategic partnerships and explore additional opportunities to partner with City of Madison SPaT Challenge project.

BTO Initiatives to Support and Enhance Connected Vehicles

Work Zones	Policy	Arterial Ops	Collaborate	Educate
Implement processes to capture, analyze, and share work zone activity data that will support CV.	Establish connected and automated vehicle policies and plans including DSRC deployment guidance.	Update traffic signal standards and policies.	Work with WisDOT staff to assess CV technology impacts on business areas.	Educate internal and external stakeholders on CV technology and ITS integration.

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WisDOT

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Bureau of Traffic Operations

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Wisconsin CAV efforts

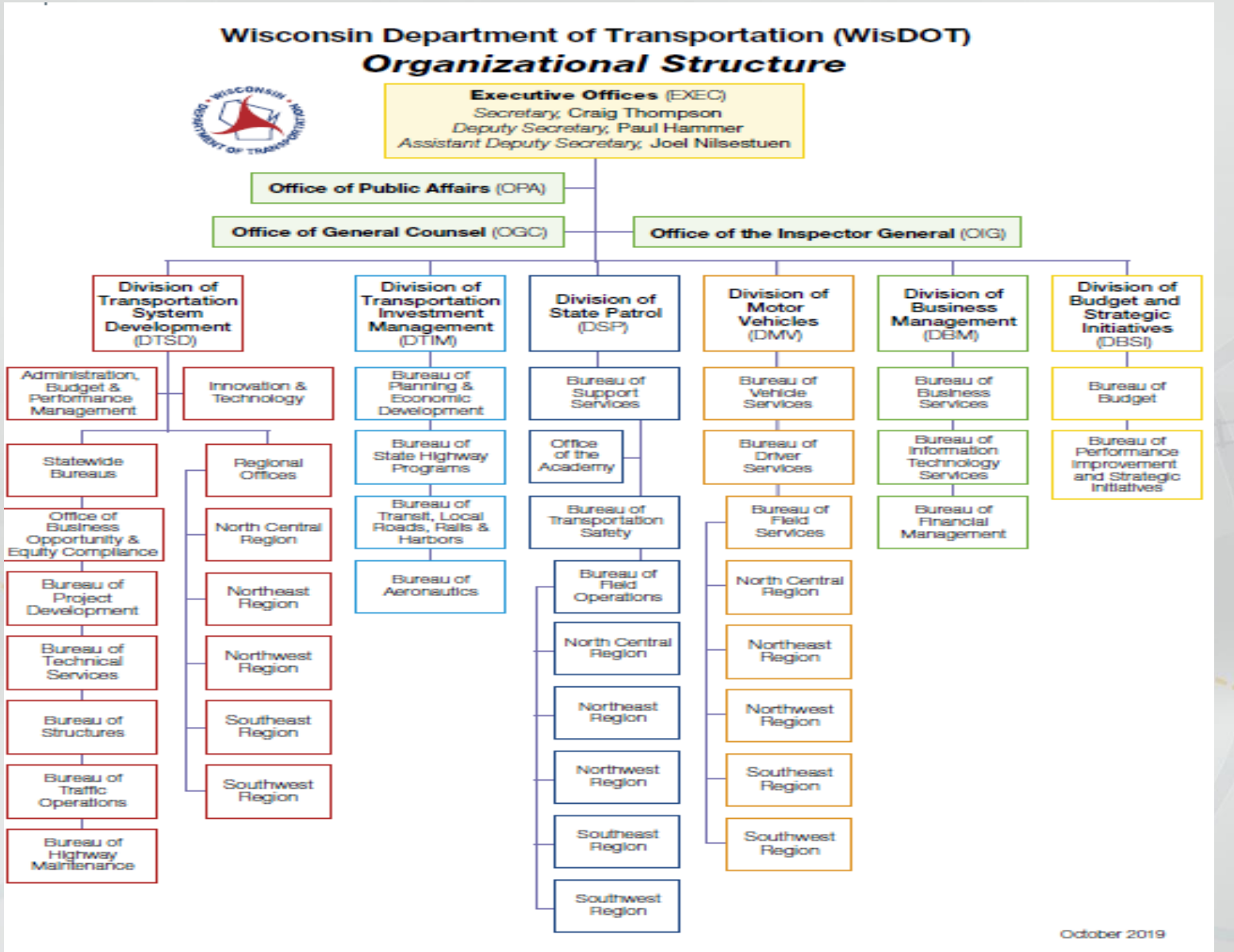
Aileen Switzer – Administrator

Division of Budget and Strategic Initiatives

Connected and Automated Vehicle Summit – MAASTO Madison, WI

October 16-18, 2019

WisDOT organizational structure



Wisconsin Steering Committee and Report

- In 2017, under Executive Order #245, the *Governor's Steering Committee on Autonomous and Connected Vehicle Testing and Deployment* was formed
- The Committee was made up of 27 members from industry, the legislature, government and academia
- WisDOT chaired and staffed the Committee
- In June, 2018, the committee delivered the *Governor's Steering Committee on Autonomous and Connected Vehicle Testing and Deployment* report summarizing the status of CAV and recommendations for the state

Wisconsin Steering committee and report

Report Recommendations

Recommendations were based on the best information available at the time, and should be updated with the advent of new advancements. The report contains background information on each recommendation.

Recommendation A	Identify WisDOT as state coordinator on CAV issues and engagement.
Recommendation B1	Create a working group to address current and upcoming issues.
Recommendation B2	Work with the legislature to authorize a CAV testing framework.
Recommendation B3	Recognize USDOT *Automated Driving Systems 2.0: A Vision for Safety, Preparing for the Future of Transportation: Automated Vehicles 3.0*, AAMVA Jurisdictional Guidelines for the Safe Testing and Deployment of Highly Automated Vehicles, and FMVSS standards.
Recommendation C	Clarify state statute and administrative CAV operation and liability.
Recommendation D	Promote Wisconsin as “Open for CAV deployment”. Highlight current connected corridor projects.
Recommendation E	Support strategic, social, economic, and environmental partnerships through the CAV working group.

CAV Responsive Implementation

- **Truck Platooning - Legislative Change**
  - 2017 Wisconsin Act 294 (effective in 2018) created an exception in State Statute (ss. 346.14) to allow electronically connected vehicles (except for the lead vehicle) to maintain a following distance of less than 500 feet
  - If not electronically connected, operators are required to maintain a minimum distance of 500 feet
  - Statute defines a “platoon” as a group of individual motor vehicles traveling in a unified manner at electronically coordinated speeds
  - All vehicle operators must adhere to the statute’s requirement of not following more closely than what is ‘reasonable and prudent ‘

- **Operational Changes at WisDOT**
  - Dedicated resources to evaluate and integrate emerging issues and technology into WisDOT

CAV Responsive Implementation

- **Project Level Integration - I94 North South corridor**
  - Integration of technology elements to meet immediate operational needs and leverage future CAV deployment opportunities
  - Project completion summer 2020
- **Partnering, Collaboration and Monitoring**
  - Engagement at national and regional level
  - Review of 2018 Committee report recommendations and governance structure (internal/external)
  - Academia – UW TOPS Lab
  - Academic/Public/Private sector dialogue (e.g., AV Forum)
  - Municipal initiatives (e.g. Racine – Smart City)

Thank you!