Wisconsin Automated Vehicle External (WAVE) Advisory Committee
Meeting Minutes
November 13, 2025, 9:00 am – 2:50 pm
Hill Farms State Office Building, Madison, WI
Room - South 149

Attendance

WAVE Members Present: Arthur Harrington (WI ACES), Christopher Hiebert (Southeastern Wisconsin Regional Planning Commission), Jeff Lewandowski (MGA Research Corporation), Raymond Mandli (Mandli Communications), David Noyce (UW Madison engineering), Sandi Pendleton (Wisconsin Technology Council; Wisconsin Bike Fed), Yang Tao (City of Madison), Evan Umpir (Wisconsin Manufacturers & Commerce)

WAVE Member Organization Proxies Present: Xiaopeng Li (University of Wisconsin–Madison), Brian Scharles (TAPCO), Tom Shi (University of Wisconsin-Milwaukee), Joe Splinter (Office of WI Senator Jeff Smith), Tyler Tkachuk (ITS Wisconsin), Kurt Walker (Federal Highway Administration Wisconsin Division)

Wisconsin Department of Transportation (WisDOT) Staff Present: Joel Nilsestuen, Lea Collins-Worachek, June Coleman, Stephanie Arduini, Brad Basten, Evelyn Bromberg, Tracy Drager, Brian Elliot, Kyle Hemp, Reed McGinn, Asad Rahman, Mathias Rekowski, Ethan Severson , Johanna Schmidt, Kamden Stark, Todd Szymkowski, Matt Umhoefer, Chuck Wade

Guest presenter: Frank Douma (University of Minnesota)

Public attendance: Two members of the public attended.

Meeting discussion

Welcome and Opening Remarks – WisDOT Assistant Deputy Secretary Joel Nilsestuen welcomed WAVE members and highlighted WisDOT's commitment to innovation and safety. He noted ongoing and upcoming research priorities including CAV connectivity during inclement weather, ADAS performance in adverse conditions, and wrong-way driving countermeasures. The meeting is an opportunity to explore vehicle telematic data, an emerging technology with strong potential to improve transportation safety, operations, and mobility.

Meeting Overview – WisDOT Division of Budget & Strategic Initiatives (DBSI) Administrator Lea Collins-Worachek outlined the focus on telematic data and its potential applications for addressing transportation challenges. She emphasized that this represents an emerging issue requiring collaborative feedback to explore both opportunities and challenges. The agenda included technical presentations on telematics data itself, privacy considerations, and breakout sessions for committee discussion.

CAV Transportation Resource Guide Update – WisDOT DBSI Strategic Policy Analyst Brad Basten reported on the progress of the *CAV Transportation Stakeholders Resource Guide*, which is structured around economic or geographic focus areas (e.g., small towns, urban centers, healthcare facilities). The guide will provide practical guidance for communities considering CAV research, pilots, or deployment. Publication is targeted for March 2026 in PDF format.

Voices of the WAVE - WAVE members shared relevant updates in their areas of work:

- Art Harrington noted his participation in air management studies and highlighted potential WisDOT involvement in emission-related policy discussions.

- Sandy Pendleton emphasized persistent reckless driving concerns (approximately 140 deaths annually) and highlighted three significant developments: (1) new Wisconsin law allowing vehicle impoundment in reckless driving cases; (2) traffic safety camera pilot bills for Milwaukee; and (3) Tesla's "Mad Max" driver profile feature, which raises concerns about whether autonomous vehicle standards should be established at federal or state levels.

Vehicle telematics probe data – What is it?

Dr. Xiaopeng (Shaw) Li (Director, Connected & Autonomous Transportation Systems Laboratory, UW-Madison) provided an overview of telematics data sources and applications. Dr. Li discussed several facets of telematic data including:

Data Sources

- Smartphone tracking of user journeys
- Modern vehicles with multi-modal sensor suites

Data Types

- Position and kinematics (location, speed, acceleration) with accuracy ranges of 3-10 feet for vehicles and 10-16 feet for smartphones
- Vehicle-specific data including make/model, fuel consumption/battery level, seat belt use, tire pressure, warning messages, and adaptive cruise control (ACC) activation
- Dash camera footage

Major Data Vendors

- Vehicle data: Streetlight (GM brands), Compass (BMW, Tesla), Nira Dynamics, and TomTom
- Cellphone data: Cambridge Mobile Telematics, Arity

Data Availability and Privacy Treatments: Telematics data vendors collect more granular data (tire pressure, VINs, consistent vehicle IDs) than currently released to transportation agencies. Several privacy protections have been implemented by OEMs and by 3rd party data aggregators: exact locations are blurred, trip IDs reset with each trip to prevent tracking over time, and full trips are segmented into shorter trip segments. However, concerns remain about the policy gap between data that exists and data that is shared.

Privacy Finding: There is currently no standard practice for informing users about data collection and data sharing. Users may be unaware their data is being collected, though some vehicle models now require opt-in for certain features. Data sharing agreements vary significantly by manufacturer and company, creating inconsistency in consumer awareness and control.

Applications of Vehicle Telematics Data

<u>Offline Applications (Planning and Analysis):</u>

- Origin-destination (OD) and journey data for transportation planning
- Route patterns and travel behavior analysis
- Safety risk identification through detection of reckless behaviors (hard braking, sudden lane changes, risky maneuvers)
- Before/after project evaluation to measure intervention effectiveness

- Speeding analysis and identification of high-risk corridors

Real-Time Online Applications:

- Crash and anomaly detection through identification of sudden mobility decreases
- Weather alerts and friction detection using acceleration data
- Wrong-way driving detection using trajectory analysis
- Traffic incident alerts for infrastructure and emergency response coordination

Current Implementation Status:
UW-Madison is conducting pilot projects and demonstrations to validate safety applications of telematics data. Research suggests that penetration rates of 7-10 percent may be sufficient for anomaly detection, though higher penetration improves accuracy. Data aggregation and summarization significantly reduce storage requirements compared to raw sensor data.

Traffic Operations integration of vehicle telematic data

WisDOT DTSD Statewide Traffic Systems Engineer Todd Szymkowski presented WisDOT's current and potential uses of telematics data:

Current Traffic Management Infrastructure

WisDOT's Traffic Management Center manages 12,000 miles of roadways and responded to over 44,000 incidents in 2024 (primarily disabled vehicles and crashes). Current detection methods include:

- Speed detectors (inductive loops, non-intrusive radar, cameras, and fused radar/camera systems)
- 500+ cameras statewide (primarily on Interstate corridors; expanding to expressways and arterials) with 72-hour video retention
- Probe data for route monitoring, incident feeds, and traffic flow information
- Crowd-sourced data collection
- Coordination with public safety dispatch (911 data provides rapid incident detection)

Data Integration and Applications

Real-Time Use Cases:

- Vehicle-to-Infrastructure (V2I) communication for traffic signal control and advisory messaging
- Trajectory analysis (detection of sudden slope changes, hard braking, lane deviations)
- Potential pilot applications: red light violation warnings, pedestrian in crosswalk alerts, signal preemption, optimal speed advisory, and queue warnings

Next-Day Use Cases:

- Spot queueing identification and lane change patterns

Long-Term Use Cases:

- Identification of hazardous nighttime curves
- Truck parking characterization (formal and informal)
- Last-mile delivery pattern analysis

Future Directions

WisDOT is investigating Connected Vehicle (CV) pilot expansion with formal safety credentials management systems and refining multiple CV concepts for future grant applications. The bureau seeks to pilot all three telematics data scenarios (real-time, next-day, and long-term/trend analysis).

Operational Challenges Identified

- Video analytics lag significantly behind 911 call detection (2 minutes vs. instantaneous)
- Raw sensor data creates massive storage demands (approximately 1 GB per second); aggregation and averaging reduces demand this substantially
- Data governance remains complex. WisDOT recently established a data management group to vet sources and guide planning based on storage capacity
- Balance between probe data (state-owned, often free) and vehicle data (privately owned, requires payment) creates funding and access challenges

Data Privacy and Policy Framework

Frank Douma (Director of State & Local Policy and Outreach, Institute for Urban and Regional Infrastructure Finance, Hubert H. Humphrey School of Public Affairs, University of Minnesota) provided legal and policy context for telematics data privacy:

Privacy Versus Security

- Security protects collected data from unauthorized use
- Privacy determines whether data collection is appropriate and governs how collected data may be used. Privacy matters because public comfort with data sharing directly influences technology adoption and effectiveness. Public perception often weighs equally with legal reality in determining social acceptance.

Legal and Regulatory Landscape

General Data Protection Regulation (GDPR, EU, 2018), California Consumer Privacy Act (California, 2020), and Minnesota Consumer Privacy Act (July 2025) are notable recent privacy legislation.

Precedents for Transportation Data and Privacy

- Katz v. United States (1967): Establishes reasonable expectation of privacy test
- US v. Knotts (1983): Public roadway travel lacks privacy protection
- US v. Jones (2012): GPS tracking requires judicial warrant
- Riley v. California (2014): Mobile phones are protected "mini-computers" requiring warrant for search
- Carpenter v. US (2018): Location data from cell towers requires warrant

Personally Identifiable Information (PII) and Location Data

PII is any data that can identify a specific individual directly (driver's license) or indirectly (race, place of birth). Some data is sensitive PII like unique ID numbers, biometric data, medical records. Personally Identifiable Locational Information (PILI) is data indicating an individual's presence at a particular location at a particular time. Re-identification techniques can convert supposedly anonymized data back to PILI, creating privacy risks.

Vehicle Data Privacy Considerations

- Owner and passenger information
- Location tracking (destination, route, frequent locations)
- Sensor data (vehicle operation, onboard camera footage, voice recognition)

Privacy Expectations and Technology vary by type

- Pavement loop detection (no privacy expectation) - detects vehicle passage only

- Anonymous occupant observation (low privacy expectation) - counts passengers
- Individual vehicle observation with transponder (medium privacy expectation) - toll collection
- Red light cameras (high privacy expectation) - captures individual enforcement data
- Individual driver identification (highest privacy expectation) - uses biometric data

Wisconsin-Specific Framework

Wisconsin Statute 134.98 addresses some data privacy considerations. The state has considered bills providing greater guidance on data handling; recent Minnesota legislation provides a model for comprehensive state-level privacy protection.

Workshop sessions

Members discussed the presentations by responding to the following questions with WisDOT facilitators:

Workshop Question 1: – What does vehicle data tell us about transportation? Vehicle telematic data is provided by road users, what does that tell us about their environment? What applications using vehicle data could help road users?

Workshop Question 2: - Potential applications and benefits to stakeholders. From question #1 and the previous data/user relationship, what kind of protocols are needed to advance the use of telematics data transportation?

Workshop Question 3: - Privacy concerns. How do privacy concerns affect users' willingness to provide data from their vehicles? How does this affect potential transportation and safety applications? Ideas to address privacy policy and data sharing attitudes in different transportation sectors?

Workshop sessions – Summaries of report-out discussions

The following are highlights from the group discussions framed by the questions above. The committee discussions identified several critical considerations for telematics data usage.

Data Governance and Transparency:

- Data collection should be purpose-driven (e.g., safety, planning) rather than exploratory
- Clear public communication about data uses, benefits, and protections is essential for building trust
- A matrix or flowchart showing different data types, use cases (safety, planning, enforcement), retention periods, and access controls would improve transparency
- Performance metrics (before/after) should be shared publicly to demonstrate benefits

Privacy Protections:

- Commercial fleet data (Uber, Amazon) may present lower privacy expectations and could serve as a starting point for pilots
- State vehicle data similarly presents lower privacy concerns than personal vehicle data
- Combination of public sensor networks and private data sources should be evaluated for complementary strengths (static vs. dynamic information)
- Break full trips into shorter segments to limit re-identification risk

Funding and Infrastructure:

- Telematics data offers potential funding alternatives to traditional gas taxes through road user charging systems
- Data could inform roadway funding discussions based on usage patterns
- Public-private partnerships require clear agreements to prevent price increases and ensure technology benefits are not purely profit-driven
- Combined approaches (telematics + road sensors) allow cost-tailoring to current needs versus maintaining permanent sensor infrastructure
- Infrastructure improvements should incorporate data collection capabilities during road projects (e.g., fiber installation)

Practical Applications Identified:

- Black ice and winter condition detection using acceleration data
- Before/after analysis of rumble strips and safety interventions
- Traffic enforcement of geographic hot spots with reckless driving patterns
- Fleet management systems (state vehicles, delivery fleets) to identify risky behaviors and provide driver feedback
- Parking automation (location and space availability) and enforcement

Participants emphasized several data minimization strategies:

- Use of snapshots and averages rather than raw data streams reduces storage requirements substantially
- Aggregation at the source before transmission or storage
- Regular review of data retention schedules aligned with use-case requirements

Room Discussion: Future of Vehicle Telematic Data

- The landscape of available data and applicable regulations changes quickly, requiring ongoing monitoring and adaptability.
- Significant public data collection occurs without user knowledge; raising awareness through the CAV Transportation Stakeholders Resource Guide and inclusive policy discussions is critical.
- Clear articulation of intended uses (enforcement, safety, planning) must be communicated to the public. Madison's experience with surveillance technology ordinances demonstrated that public opposition can be overcome through transparent outreach explaining transportation benefits.
- Artificial intelligence's ability to connect datasets and identify individuals from supposedly anonymized data represents a growing privacy concern and argues for informed consent standards more robust than buried contract language.
- Real safety benefits exist (approximately one traffic fatality per day in Wisconsin); technology should advance safety and accessibility while respecting privacy through appropriate governance.
- Streetlight data already supports planning while reducing local data collection needs; fleet-based telematics (state vehicles, commercial fleets) provide immediate, practical opportunities; and ongoing UW-Madison research validates safety applications.
- Suggestion for enhanced transparency - Development of a WisDOT-specific data governance framework matrix (similar to the privacy expectations matrix presented) could clarify different data types, use cases (safety, planning, enforcement), retention periods, and access controls for both internal and public understanding.

Closing Remarks & Adjourn - DBSI Administrator Lea Collins-Worachek recapped the following key takeaways from the meeting:

- Nature of telematics data collected and privacy implications
- Changing infrastructure needs to manage incidents effectively
- Public agency responsibilities for data stewardship and transparency
- Critical importance of communicating benefits and protections to the public

She noted that telematics data represents an important ongoing discussion across state DOTs nationally, particularly regarding safety applications. The committee discussed potential hosting of the next WAVE meeting at the Traffic Management Center in Milwaukee to provide hands-on understanding of traffic operations integration.