MSU Mobility Tech Day

Nov. 2, 2018

MSU is transforming its campus into an advanced mobility ecosystem

Michigan State University is transforming its 5,200-acre campus into a live, connected ecosystem to drive mobility research and development to advance smart-vehicle technology and better understand the human element.

With much of the transformation already complete across its urban, suburban, industrial and rural zones, MSU’s controlled infrastructure and active campus make it ideal to test emerging technologies for new mobility solutions. Those include 5G data transmission, solutions for “first mile/last mile” transportation and validation of technologies for automated and connected vehicle systems.

Dean Leo Kempel explains MSU Mobility (video courtesy of MEDC).

In addition to advancing technology, MSU is taking a broad, interdisciplinary approach to the many complex factors associated with evolving transportation. Keeping people at the center of the mobility conversation, MSU is focused on sociomobility, which means understanding individual and societal effects.

“As a top-tier research institution, we are well equipped to advance mobility by leveraging our campus-wide expertise and collaborating with strong industry partnerships,” said Satish Udpa, MSU’s executive vice president for administrative services. “We are excited to showcase this holistic approach and invite partners to join us as we work to revolutionize the way people and goods move throughout the world.”

Adoption of new transportation technology raises many questions. Research and real-world testing is crucial to understand how different populations, businesses and urban planning, for example, could be affected. Planners need to ensure the right policies, laws, practices and communication are in place before “smart city” features are introduced at large scale.

“MSU’s campus is unrivaled in scope, size and diverse mobility environments, providing an ideal testing ground and validation site. Studying mobility on football or basketball game days, for example, will provide great insights on solutions for safely and efficiently navigating through densely crowded areas,” said Leo Kempel, dean of MSU’s College of Engineering. “In addition to using campus as an ecosystem for research and development of technologies,
we are looking to develop the future of human-centric, multi-modal mobility.”

How are Spartan Engineering faculty experts advancing the mobility ecosystem, visit MSU Mobility.

The autonomous vehicle technologies developed by MSU feature state-of-the-art sensors as part of the CANVAS, or Connected and Autonomous Networked Vehicles for Active Safety, initiative. MSU CANVAS researchers are developing multi-modal sensor fusion using radars, lidars, cameras and advanced algorithms designed to create “super-human” artificial intelligence for autonomous driving in four seasons of weather. They also include the university’s advanced sensing and processing technology, which at 97 percent detection accuracy currently, is industry-leading in anticipating pedestrian behaviors.

MSU’s connected campus also includes other leading technology, such as:

- V2X, or ongoing vehicle-to-vehicle and vehicle-to-infrastructure communication
- Embedded pavement sensors charged through vibrations
- Sensor and data fusion
- Biometrics for passenger identification, theft protection and owner personalization
- Cybersecurity and data updates
- ATSC 3.0 television broadcasting made available exclusively to MSU through an experimental FCC license
- Ongoing anonymous data collection of campus mobility to understand how people walk, drive, ride and park
- Connected traffic signals
- Emergency vehicle prioritization, with a goal toward automated operation
- Smart parking systems
- Electric vehicle charging systems

These smart systems will work 24/7, sending and receiving ongoing data on how more than 100,000 people move around different environments. MSU’s campus features:

- 5,200 acres (8.1 square miles) of urban, suburban, industrial and rural zones
- Nearly 60 lane miles of roads
- More than 120 miles of pedestrian walkways and sidewalks
- Nearly 20 miles of bike lanes
- Nearly 40 traffic signals, with a planned system for real-time traffic control
- Diverse population with 70,000 students and faculty, and more than 100,000 people on game days
- 545 occupied buildings
- 26,000 parking spaces
- 30,000 vehicles on campus daily
- 85-member police force, providing flexibility in traffic management
Spartan Mobility Village, the new home of MSU’s mobility labs where roadways and parking lots can be closed for testing of new technologies. In the future, unoccupied buildings will be used as a background for sensing technologies, including radar clutter simulating the sub/urban environment.

The technology, solutions and processes tested and validated using MSU's campus will help ensure the future of mobility creates safe, reliable, convenient and accessible transportation for all.