Getting Ready for Automated Vehicles – What To Do Now

2019 TRAFFIC ENGINEERING WORKSHOP AND TRANSPORTATION PLANNING FORUM
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WHY THIS TOPIC?

4

years until there will be fully autonomous vehicles on the road (Ford)

~40

years for full fleet conversion (Victoria Transport Policy Institute)
WHAT ARE CONNECTED AND AUTOMATED VEHICLES?

Connected Vehicles
Where a vehicle communicates with something outside itself
- Another vehicle
- Pedestrians
- Infrastructure (signals)
- Buildings
- Parking
- Toll systems

Automated Vehicles
Where some or all driving task is done by a machine
- Braking
- Steering
- Speed changes

The automated vehicle set to debut in Madison later this year.
WHY SHOULD WE CARE?

37,461 road fatalities in US in 2016 (NHTSA)

That’s one every 14 minutes 24/7/365

$190B saved per year in U.S. by 2050 (McKinsey)

90% reduction in accidents (AAA)

2,2000 square miles of parking need reduced (McKinsey)
LEVELS OF AUTOMATION

SAE J3016™ LEVELS OF DRIVING AUTOMATION

<table>
<thead>
<tr>
<th>SAE LEVEL 0</th>
<th>SAE LEVEL 1</th>
<th>SAE LEVEL 2</th>
<th>SAE LEVEL 3</th>
<th>SAE LEVEL 4</th>
<th>SAE LEVEL 5</th>
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<tbody>
<tr>
<td><strong>Example Features</strong></td>
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<td>• automatic emergency braking</td>
<td>• lane centering OR • adaptive cruise control</td>
<td>• lane centering AND • adaptive cruise control at the same time</td>
<td>• traffic jam chauffer</td>
<td>• local driverless taxi</td>
<td>• same as level 4, but feature can drive everywhere in all conditions</td>
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<td>• blind spot warning</td>
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<td>• lane departure warning</td>
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For a more complete description, please download a free copy of SAE J3016: [https://www.sae.org/standards/content/j3016_201806/](https://www.sae.org/standards/content/j3016_201806/)
LEVELS OF CORRIDOR READINESS

- Stripes & Signs
- Communications
- Space Available
LEVEL 1: STRIPES AND SIGNS

• Current AV’s use camera vision of stripes for lane keeping
• What is a clear stripe?
• CalTrans Recommendations
  • 6” Stripes
  • Use Thermoplastic or similar for better durability
LEVEL 1: STRIPES AND SIGNS

- Follow MUTCD
- Standard signs are easier for AV to interpret meaning
LEVEL 1:
STRIPES AND SIGNS

• AV can read signs differently

• 3M is working on new types of signs with IR bar codes for machine vision

Get info from: https://multimedia.3m.com/mws/media/1584051O/2d-barcode-whitepaper.pdf
LEVEL 2: COMMUNICATIONS

- Signal Phase and Timing (SPAT) challenge
- Install CV communications in one corridor of ~20 signals in all 50 states
- Demonstrate benefits of communications

Get info from: https://transportationops.org/spatchallenge
ITE help from spat@ite.org
LEVEL 2: COMMUNICATIONS

- Madison, WI is meeting the SPAT Challenge!
- Park Street / Fish Hatchery Road Corridor
- Pilot and deploy connected vehicle technology to improve:
  - Safety
  - Mobility
  - Bus on-time performance
  - Equity
- Vehicle to infrastructure (V2I), Vehicle to Vehicle (V2V), Vehicle to Everything (V2X)
- Position Madison and Wisconsin as the Upper Midwest hub for CV & AV
LEVEL 3: SPACE ALLOCATED

AECOM Flex Zones

- Use of signage and lights to adjust curb use based on time of day / demand
- Communicate open spaces with vehicles
- Reserve space ahead of time
- Automatically charge users parking fee
LEVEL 3: SPACE ALLOCATED

**Flex Lanes Concept**
- Special use lanes that allow AV, along with other uses like HOV & transit
- As demand for AV grows, increase the number of Flex Lanes, and reduce General Purpose (GP) Lanes
- Separated AV-only lanes may provide for faster speeds and lower headways, increasing the capacity of the roadway.
WHY YOUR ADVOCACY MATTERS

I DON'T KNOW HOW TO SAY THIS BUT YOUR ADVOCACY IS KIND OF A BIG DEAL

It's true!
STATE REGULATORY CONTEXT

- Only 14 states have no legislation or executive orders related to autonomous vehicles
- Wisconsin has both
FEWER LAWS = MORE FREEDOM

• Madison is introducing a driverless shuttle later this year on East Washington Ave.
LAND USE CHANGES

- Most cars are parked 95% of the time

Red areas indicate land dedicated to parking in downtown Peoria, IL

Graphic from StrongTowns.org
BE THE VOICE

NOW...

OMG, THERE’S NOBODY DRIVING THAT CAR!

THE FUTURE...

OMG, THERE’S SOMEBODY DRIVING THAT CAR!

SEE MORE AT NATETHEROBOT.COM

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WE NEED TO SAVE THE SPECTRUM

Dedicated Short Range Communications (DSRC) 5.9 GHz Safety Spectrum is here
5G AND 5.9GHZ ARE NOT THE SAME THING

Cell Companies use a variety of frequencies
Low 700 Mhz – Long Range Service
Mid 3.4 – 3.8 GHz – Data Coverage
High 26 GHz – Localized Gigabit Data

5.9 GHz
ITE INVOLVEMENT IN AUTOMATED VEHICLES

• ITE Communities: Connected and Autonomous Vehicles
• ITE Statement on Connected and Automated Vehicles
• ITE Comments on US DOT Automated Vehicle 3.0 Guidance
• ITE Participates in the CAT Coalition (DOT’s, Automakers, Academia, Private)
• ITE Comments on FCC Discussions on DSRC Spectrum
• Get Involved!