Intelligent Transportation Systems

Complete Streets and Technology Conference

April 10, 2019
Sending a platoon of horse drawn buggies. Turn your light green in two hours.
Origins of ITS

- Salt Lake City; 1917
  - First IC signal system
  - Manual switch
- Houston; 1922
  - First automatic IC signal system
Sample ITS Infrastructure

- Edge Devices
- Ethernet
- Field Switching
- Fiber Optic or Wireless (Backbone)
- Aggregation
- ATMS
- VDS
- DSRC
Future of ITS

- Improved ITS devices
  - Detection enhancements
  - Signal Performance Measures (SPM)

- Increased communication (V2X)
  - Dedicated short range communication (DSRC)
  - Bluetooth
  - 5G

- Connected and Automated Vehicles (CAV)
<table>
<thead>
<tr>
<th>Level</th>
<th>Human Driver</th>
<th>Automated System</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>NO AUTOMATION</td>
<td>N/A</td>
</tr>
<tr>
<td>1</td>
<td>DRIVER ASSISTANCE</td>
<td>SOME DRIVING MODES</td>
</tr>
<tr>
<td>2</td>
<td>PARTIAL AUTOMATION</td>
<td>SOME DRIVING MODES</td>
</tr>
<tr>
<td>3</td>
<td>CONDITIONAL AUTOMATION</td>
<td>SOME DRIVING MODES</td>
</tr>
<tr>
<td>4</td>
<td>HIGH AUTOMATION</td>
<td>SOME DRIVING MODES</td>
</tr>
<tr>
<td>5</td>
<td>FULL AUTOMATION</td>
<td>SOME DRIVING MODES</td>
</tr>
</tbody>
</table>

For on-road vehicles:
- Steering and acceleration/deceleration
- Monitoring of driving environment
- Fallback when automation fails
- Automated system is in control

Source: SAE International
Connected Automation

Autonomous Vehicle
Operates in isolation from other vehicles using internal sensors

Connected Vehicle
Communicates with nearby vehicles and infrastructure

Connected Automated Vehicle
Leverages autonomous and connected vehicle capabilities
Components of a V2I System

We Make a Difference
Connected Vehicles Pilots

New York City

State of Wyoming

Tampa-Hillsborough

U.S. Department of Transportation
Connected Vehicle Applications

- **V2I**
  - Speed compliance
  - Curve
  - Work zone
  - Red light violation
  - Emergency

- **V2V**
  - Forward crash
  - Blind spot

- **V2I**
  - Wrong Way
  - Intersection movements
  - Ped in X-walk
  - Transit priority

- **V2V**
  - Right turning vehicle in front of transit

- **V2I**
  - Situational awareness
  - Weather
  - Work zones

- **V2V**
  - Distress
  - Forward collision
ITS and Complete Streets

- Safety Improvements
  - V2I – Pedestrians/Bicycles
  - V2V

- Decreased congestion
  - Increased transit ridership with TSP
  - Increased efficiency
  - Reduced parking spaces
Thank You!

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