Northeast Transportation Safety Conference
Connected and Automated Vehicles

Jeff Stewart
Assistant Vice President, Global Public Policy
AT&T External & Legislative Affairs
AT&T Vehicle Solutions

**Embedded**
Wholesale and retail services for manufacturers and consumers

**After-market**
Wi-Fi hotspot and car connections for after-market installations

**Fleet**
Improving visibility, monitoring and control over compliance for small and large fleets

AT&T Connected Car Services

<table>
<thead>
<tr>
<th>Global Sim</th>
<th>Split Billing</th>
<th>FOTA/SOTA</th>
<th>Wi-Fi Landing Page</th>
<th>Content Delivery</th>
<th>Analytics</th>
</tr>
</thead>
</table>

© 2017 AT&T Intellectual Property. All rights reserved. AT&T, Globe logo, Mobilizing Your World and DIRECTV are registered trademarks and service marks of AT&T Intellectual Property and/or AT&T affiliated companies. All other marks are the property of their respective owners.
Convergence of IoT Platforms for Government and Commercial Services
Convergence of Policy Issues Resulting from IoT Platforms
Demonstrating Potential Cellular Roles in Supporting V2X Communications

Two proof-of-concept projects showing cellular support for V2X:

- Event Messaging and intelligent extension of the reach of DSRC-based messages beyond ~300m
- Certificate Management functions (i.e. within the SCMS ecosystem)

Legend:
- Fiber
- Cellular Unicast or Broadcast
- Wireless Broadcast + Unicast &/or Uplink
- Wireless Broadcast
- Cellular Broadcast
- Wi-Fi Direct
- Bluetooth

© 2017 AT&T Intellectual Property. All rights reserved. AT&T, Globe logo, Mobilizing Your World and DIRECTV are registered trademarks and service marks of AT&T Intellectual Property and/or AT&T affiliated companies. All other marks are the property of their respective owners.
### Society of Automotive Engineers (SAE) Automation Levels

<table>
<thead>
<tr>
<th>Level</th>
<th>Automation Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No Automation</td>
<td>Zero autonomy; the driver performs all driving tasks.</td>
</tr>
<tr>
<td>1</td>
<td>Driver Assistance</td>
<td>Vehicle is controlled by the driver, but some driving assist features may be included in the vehicle design.</td>
</tr>
<tr>
<td>2</td>
<td>Partial Automation</td>
<td>Vehicle has combined automated functions, like acceleration and steering, but the driver must remain engaged with the driving task and monitor the environment at all times.</td>
</tr>
<tr>
<td>3</td>
<td>Conditional Automation</td>
<td>Driver is a necessity, but is not required to monitor the environment. The driver must be ready to take control of the vehicle at all times with notice.</td>
</tr>
<tr>
<td>4</td>
<td>High Automation</td>
<td>The vehicle is capable of performing all driving functions under certain conditions. The driver may have the option to control the vehicle.</td>
</tr>
<tr>
<td>5</td>
<td>Full Automation</td>
<td>The vehicle is capable of performing all driving functions under all conditions. The driver may have the option to control the vehicle.</td>
</tr>
</tbody>
</table>
“...automated vehicles shall be cooperative and connected vehicles.”

European Commission – C-ITS Phase II Final Report, September 2017
“While some believe that AV technology is advancing so rapidly that it will soon remove the need for connected vehicles (CV) technology such as V2V, V2I and V2P technologies; most in the industry perceive CV technology as a complementary technology that will lead to the advancement of AVs.”

Connecticut Department of Transportation

Comments to NHTSA Federal Motor Vehicle Safety Standard 150 Vehicle-to-Vehicle Communications

Docket No. NHTSA-2016-0126
Future Roadways: Convergence of Commercial Communications and Surface Transportation

Transportation & commercial communications infrastructures have many common requirements

There is increasing reliance on both communications infrastructures for public safety purposes

There are (at least) four current sets of interrelated infrastructure deployment policy initiatives

1) Smart Cities
2) Small Cell Deployments
3) FirstNet
4) Federal Infrastructure Initiatives in:
   - Communications: Broadband Deployment
   - Transportation: INFRA & TIGER Grants, ITS Deployments, etc.
Small Cells
Existing AT&T Cellular Coverage of National Highway System

**By End of Year 2017 (3G+LTE)**

<table>
<thead>
<tr>
<th>NHS Road Categories</th>
<th>Percent of Road Miles Covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interstates</td>
<td>&gt;95% of all NHS Road Miles</td>
</tr>
<tr>
<td>State Highways</td>
<td>&gt;430,000 road miles total</td>
</tr>
<tr>
<td>US Highways</td>
<td></td>
</tr>
<tr>
<td>Other Main Roads</td>
<td></td>
</tr>
</tbody>
</table>

AT&T’s Network Covers more than 99% of Americans

- Nearly 70,000 existing cell sites
- ~100 MHz of spectrum in use (top 100 metros)

Densification of AT&T’s network is driving Small Cell Deployments to:

- Expand capacity and coverage
- Prepare for 5G
Synergies between V2I, CAVs, and Small Cells Deployments

Same backhaul infrastructure could support both

The complexities and costs of deploying a network of V2I Road Side Units (RSUs) are great, and could be redundant with commercial networks already being deployed with private capital.

Those commercial networks will still need access to transportation infrastructure to provide both V2I and commercial capabilities.

PPP Model Applicability

Smart City Deployments are beginning to look to new PPP models to jointly support Smart City and Small Cell deployments, which together will help enable connected vehicles.

Transportation-based PPP models are also being increasingly emphasized by US Department of Transportation as means to finance State and local transportation projects.

FirstNet PPP Model for public safety communications—has relevance to transportation and connected cars as well.