Transportation Technology Influencing Our Future

Panel Session Presentation
TPO Annual Retreat
March 23, 2018
Brannon Center, NSB Florida

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Professor of Mechanical Engineering
Overview

- Societal changes driving technology
- Why safety (and product liability lawsuits) may expedite vehicle automation
- Technology will probably augment driver capability for a generation
- New problems, concerns and opportunities will emerge as people adapt to the technology
- Overview of Embry-Riddle display and demo vehicles
## US Traffic Fatalities
Insurance Institute for Highway Safety

<table>
<thead>
<tr>
<th>Year</th>
<th>Fatalities</th>
<th>Vehicle Miles (billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1921</td>
<td>13,253</td>
<td>55</td>
</tr>
<tr>
<td>1972</td>
<td>54,589</td>
<td>1,259</td>
</tr>
<tr>
<td>2005</td>
<td>43,510</td>
<td>2,989</td>
</tr>
<tr>
<td>2016</td>
<td>37,461</td>
<td>3,220</td>
</tr>
<tr>
<td>2050</td>
<td>0?</td>
<td>10,000?</td>
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Who Will Learn to Drive in 2050?

Social Change: Change in the % of People with a Driver’s License*

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<tbody>
<tr>
<td>16</td>
<td>-47.0%</td>
<td>-21.2%</td>
<td>-10.9%</td>
</tr>
<tr>
<td>17</td>
<td>-34.8%</td>
<td>-10.2%</td>
<td>-0.2%</td>
</tr>
<tr>
<td>18</td>
<td>-25.2%</td>
<td>-8.1%</td>
<td>-0.3%</td>
</tr>
<tr>
<td>19</td>
<td>-21.0%</td>
<td>-8.6%</td>
<td>-0.4%</td>
</tr>
<tr>
<td>20-24</td>
<td>-16.4%</td>
<td>-6.5%</td>
<td>-3.8%</td>
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*The University of Michigan Transportation Research Institute, January, 2016
Basic Principle of Product Liability:

A manufacturer or distributor of a product is liable to compensate a person injured by that product if the product is defective.

But what is a defect?
Product Liability Law

- State-of-the-Art is a valid defense
- Failing to use State-of-the-Art technology can be considered a defect
- Cost vs. benefit considered
- Meeting codes and standards is not a defense

State-of-the-Art: No better design alternative existed
Rear-End Crashes 2011-2015

- Volusia County: 15,655
- Flagler County: 1,838
- 28% of all crashes
- Increase of 168% over the five-year period

State-of-the-Art Technology Solutions will Help

Automatic Emergency Braking (AEB) standard feature across almost all models by 2022
Embry-Riddle Systems on Display

EcoCAR

RobotX “Minion”

Autonomous Hybrid Escape “Plan B”
2016 ERAU Camaro EcoSuperSport

0-60: 4.9s    Horsepower: 360hp    Torque: 650ft-lbs
Economy: 57mpg    Electric Range: 40mi
Minion Research Platform

Research Topics
• Situational Awareness
• Hybrid Energy Systems

Applications
• Port Surveillance
• Endurance Missions
• Bridge Inspection
Minion Research Platform

Deep Learning Approach to Computer Vision

Classification and Detection
Objective: develop automated system for inspecting:

- Fence Integrity (FAR 139.335)
- Wildlife Incursions (FAR 139.337)
- Paved Areas (FAR 139.305)
Autonomous Security Patrol

Autonomous Demo, August 9, 2013
Distance Traveled: 1.48 miles
Velodyne Laser Scanner Data
Thanks