Driver Distraction:
Understanding the Problem, Identifying Solutions

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What is Driver Distraction?
High Technology vs Low Technology Distractions

• May engage attention longer and more frequently
• May place more cognitive and manual demands on drivers
• May interrupt drivers at unsafe times
The Safety Problem of Electronic Distractors

Recognized by many manufacturers

Crash data not complete regarding existing sources of distraction
Distraction and Crash Risk: NHTSA Research Focus

Driver Willingness to Use

Distraction Demands of Driver/Vehicle Interface
Willingness to Engage While Driving

Results: Perceived Risk Assessment

1. Talk with passenger
2. Take notes during phone conversation
3. Extended conversation
4. Talk with passenger
5. Read a Map
6. Extended conversation
7. Extended conversation
8. Extended conversation
9. Extended conversation
10. Extended conversation
Inventory of Navigation Interface Designs: Task Demand

Results: Mean Minimum, Maximum Keystrokes for Entering a Street Address for Navigation Systems

- Mean Minimum Keystrokes: 12
- Mean Maximum Keystrokes: 32.67
How Interface Design Can Influence Driver Performance

Results: Average Number of Lane Exceedences per Trial by Device

<table>
<thead>
<tr>
<th>Device</th>
<th>Average Number of Lane Exceedences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nav System - Joystick Entry</td>
<td>0.9</td>
</tr>
<tr>
<td>Nav System - Knob Entry</td>
<td>0.8</td>
</tr>
<tr>
<td>Nav System - Voice Entry</td>
<td>0.7</td>
</tr>
<tr>
<td>Nav System - Key Entry</td>
<td>1.0</td>
</tr>
<tr>
<td>Cell phone - Dialing</td>
<td>0.1</td>
</tr>
<tr>
<td>Radio Tune</td>
<td>0.2</td>
</tr>
</tbody>
</table>
100-car Naturalistic Driving Study

• **Goals:**
  - Understand the preceding factors associated with crashes, near crashes, critical events
  - Develop relationship between task completion time, eyes-off-road time and critical incident likelihood
  - Provide baseline relating performance to safety-related risk

• **Overview: 1 year, 43K hours, 1.37M miles**
  - Approx. 76 crashes recorded, with about 38% related to driver distraction
  - Will also be looking at near crashes

• **Research questions include:**
  - Assessment of willingness to engage in and associated risk of distracting activities
  - Types of critical events related to distraction
  - Potential role of crash warning systems in preventing distraction related crashes
100-Car Naturalistic Driving Study

Data Collection Capabilities
CAMP - Driver Workload Metrics Project

Measuring workload in lab

Measuring workload on road

CAMP
Driver Workload Metrics Consortium

Ford

GM

NISSAN

TOYOTA

IVI Light Vehicle Enabling Research Program
Driver Assistance Systems
To Alert Distracted Drivers

Forward Collision Warning System
Road Departure Warning System
Intersection Collision Warning System
Adaptive Interface Workload Management

SAfety VEhicle Using Adaptive Interface Technology
In conclusion...