

Implications of Emerging In-Vehicle Technology for Highway Safety Data

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Technology - New Opportunities and Risks

- Safety is often cited as the number one priority for federal, state, and local transportation agencies
- Technologies within vehicles provide a powerful new source of data about the roadway environment, how crashes happen and how best to respond to and avoid them
- What should the transportation community be considering?

Examples of Applications

- New Technology Safety Evaluation
- Data Improvement
- Driver Distraction
- Problem Identification

Safety Evaluation: Electronic Stability Control (ESC) Evaluation

- NHTSA Findings Estimate Universal ESC would:
 - Save between 5,300 and 10,300 lives/year;
 - Reduce risk of single vehicle crashes by 40 percent;
 - Reduces multiple-vehicle *fatal* crashes by 32 percent.
- Used 17-character VIN #s to analyze effectiveness along with separate databases of vehicle features
- Could be done with other in-vehicle technologies
 - Collision Avoidance
 - Blind Spot Detection
 - Adaptive Cruise Control
 - Backup Cameras

Safety Evaluation: Electronic Stability Control (ESC) Evaluation

- What agencies need to consider:
 - IIHS as a partner for research (not administration)
 - Collecting 17-character VIN #s
 - Quality of VIN #s collected (Need checks for consistency, validity).
- For information on partnering, contact:
 - Highway Data Loss Institute (703) 247.1600

Data Improvement: Event Data Recorders

- Sensors that record specific data elements immediately before and after a crash event
- NHTSA mandate that by 2011 all new EDR must record same 15 data elements (e.g. restraint-use, speed, brake-use, etc.)
- 65% of 2005 model passenger vehicles and 85% of passenger vehicles by 2010
- However...states must have specialized EDR data retrieval units

Data Improvement: Event Data Recorders

- Implications:
 - More reliable data; not based upon subjective accounts (e.g. restraint-use misclassification)
 - Improve efficiency of data collection (24 of 75 recommended MMUCC data elements could be provided by EDRs)
 - New tools to investigate individual traffic crashes for legal proceedings
- Limitations:
 - Vehicle owners own the data, but may provide them if willing. Otherwise, a warrant is required
 - EDRs may not survive crash
 - Retrieving data may be problematic
- For More Information: NCHRP Project 17-24: “Use of Event Data Recorder (EDR) Technology for Highway Crash Data Analysis”

Emerging Problems: Driver Distraction

- Recent studies show cell phone use increases risk for a crash anywhere from 30% to 400%. It does not appear to matter whether the cellular phone was handheld or not.
- Almost 80% of all crashes and 65% of near-crashes in NHTSA's 100-Car Naturalistic Driving Study involved driver looking away from roadway prior to onset of conflict.
- Technologies with impacts for driver distraction:
 - Cellular Phones
 - Navigation
 - Communications (e.g. speech-based email)
 - Entertainment (e.g. music, internet, etc.)

Emerging Problems: Driver Distraction

- Techniques for Study*:
 - On-Road and Test Track Studies
 - Driving Simulator Studies
 - Dual-Task Studies
 - Eye Glance Monitoring Studies
 - Visual Occlusion Method
 - Peripheral Detection Task
 - Data from EDRs and VINs

*Driver Distraction: A Review of the Literature, Monash University, Accident Research Center, Nov. 2003

Problem Identification: Traffic Probes

- Means of data collection moving away from fixed sensors toward vehicle-based information
- Based upon 'vehicle probes' incorporating GPS units and/or cell phones
- Benefits include: low cost, full coverage, self-sufficient business modes (i.e. many uses for traffic data).
- Safety applications include:
 - Better denominators (i.e. VMT) used to determine crash risk, analysis and prediction
 - Monitor highway speeds (including evaluation of countermeasures)
 - Targeted deployment of safety personnel (especially in rural areas)

Problem Identification: Traffic Probes

- Two Regional Systems
 - Baltimore (GPS)
 - Missouri (GPS & Cellular)
 - Key portions of I-70 & I-44 covered before end of 2007
 - Parts of St. Louis & Kansas City
 - Data also used to manage traffic around I-64 construction
- Other smaller systems in place
- Well developed systems internationally in places such as UK and Israel

Questions?

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