Toward Zero Deaths
A National Strategy on Highway Safety

Stakeholder Webinar
SAFER VEHICLES

June 21, 2010
Welcome

- Webinar Hosts:
  - Ian Grossman, AAMVA
  - Barbara Harsha, GHSA
  - Steve Keppler, CVSA
  - Ron Knipling, Ph.D.
Housekeeping

- Webinar is closed captioned and being recorded
- Your phone line is on mute, to make a comment:
  1. Press 
     - Record your name and who you represent
     - You will be placed in queue to speak
     - Make your comment after you are announced
     - Please limit your comment to 2 minutes or less
  2. Use “Chat” to type in your comments
Purpose of Webinars

- Gather stakeholder input on specific topics
  - Current programs
  - Current challenges
  - Opportunities for overcoming challenges
  - Promising strategies

- Gather stakeholder ideas on implementation strategies
  - National strategy as a whole
  - Topic specific
Overview of Today’s Discussion

- Background on National Strategy
- Vehicle Issues
  - Current Challenges and Initiatives
- Open Discussion
Background

- Progress Has Been Made in Improving Highway Safety...
  - Lowest fatality levels in 50 years
  - Safety partnerships have been strengthened
  - Greater leadership focus on safety
- ...But We Still Face Significant Challenges
  - 33,963 fatalities in 2009
  - Legislative and other barriers to implementing proven strategies
Fatalities and Fatality Rate, by Year

Fatalities and Fatality Rate per 100M VMT

Fatalities: 0, 10,000, 20,000, 30,000, 40,000, 50,000, 60,000

Fatality Rate: 0, 1, 2, 3, 4, 5, 6


33,963 fatalities in 2009

Fatality Rate per 100M VMT: -16.4%, -10.9%, -10.5%, -8.9%

1.16 fatalities per 100M VMT in 2009
Why Now?

- New Political Leadership
- Reauthorization
- Uncertain Trend for the Future
- Better Use of Limited Resources
- Build on Our Success
National Strategy

- Build on Existing Foundation of Proven Strategies, Relationships, and Leadership
- Cultural Change: Change Americans’ Attitudes Toward Highway Safety
- Involvement from Wide Variety of Highway Safety Stakeholders
- “Owned” by All Stakeholders
Two Key Products

- National Safety Plan and Outreach Program
  - A data-driven plan that includes key emphasis areas, projection of future needs, promising countermeasures, and expected improvements
  - Goal: adoption by safety stakeholder organizations in 2011

- Implementation Process
  - Strategies for developing strong leadership and champions
  - Support from and for organizations that directly impact highway safety
  - A program for changing highway safety culture in the United States
Key Areas

- Safer Drivers
- Safer Vehicles
- Safer Vulnerable Users
- Safer Infrastructure
- Emergency Medical Services
- Data Systems and Analysis Tools
- Safety Culture
Development Process

- Initial Outline and Work Plan
  - Initial stakeholder meeting (September 2009)
  - Assemble stakeholder group
  - Gather input from stakeholders
    - Webinars, conferences and meetings
  - Develop white papers
  - Develop outline and work plan
  - Stakeholder workshop - webcast
- Phase 2: Develop Strategy (Spring 2011)
- Phase 3: Adoption and Implementation by Multiple Organizations
Steering Committee

Members:
AASHTO         Tom Sorel, Chair (Tony Kane)
AAMVA          Neil Schuster
GHSA           Vern Betkey, Vice Chair (Barbara Harsha)
CVSA           Steve Keppler
IACP           Richard Ashton
NACE           Tony Giancola
NASEMSO        John Bixler

Ex-Officio Members:
FHWA            Joseph Toole
NHTSA          Marlene Markison
FMCSA          William Quade
Safer Vehicles

- Background/Introduction
- Cross-Cutting Issues
  - Improving driver awareness
  - Modifying driver behavior
  - Conspicuity & visibility
  - Vehicle-to-vehicle & vehicle-to-infrastructure technologies
- Issues specific to passenger vehicles
- Issues specific to large trucks
- Obstacles, challenges, & strategies
- White paper authors:
  - Richard Retting, Sam Schwartz Engineering
  - Ron Knipling, safetyforthelonghaul.com
Improving Driver Awareness

- Forward Collision Warning Systems (with Adaptive Cruise Control)
- Side Object Detection Systems (Lane Change/Merge Warnings)
- Lane Departure Warning Systems
- Backing Collision Warning Systems

Courtesy Iteris, Inc.
Modifying Driver Behavior & Crash Risk

- Alcohol Detection & Interlock (for all vehicles?)
- Driver Alertness & Performance Monitoring
- Automatic Speed Control/Speed Limiters (for all vehicles?)
- Electronic Stability Control
- Electronic Drivers License
- Reducing Driver Distraction
Driver Alertness & Performance Monitoring

- **Real-time Display**
- **Psychophysiological Measures of Driver Alertness**
- **Processing Algorithm & Recording System**
- **Measures of Driver Performance**
Conspicuity & Lighting

- Intelligent Lighting Systems (e.g., automatic aiming & adjustment of headlight beams)
- Night Vision Enhancement (e.g., infrared display)
- Daytime Running Lights
Vehicle-to-Vehicle & Vehicle-to-Infrastructure Technologies

- Intersection Collision Warnings
- Left Turn Assistant
- Pedestrian Crossing Information
- Stop Sign & Signal Violation Warnings
- Road Condition Warnings
- Curve Speed Warnings
- Wrong Way Driver Warnings
### Principal Applicability of Vehicle-Based Countermeasures

<table>
<thead>
<tr>
<th>Principally applicable to passenger vehicles:</th>
<th>Highly applicable to both:</th>
<th>Principally applicable to large trucks:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol Detection &amp; Interlock</td>
<td>Forward Collision Warning Systems</td>
<td>Roll Stability Control &amp; Roll Stability Advisor</td>
</tr>
<tr>
<td>Emergency Brake Assist</td>
<td>Lane Departure Warning Systems</td>
<td>Low Bridge Warnings</td>
</tr>
<tr>
<td>Crashworthiness Enhancements</td>
<td>Side Object Detection Systems</td>
<td>Onboard Safety Monitoring (OBSM)</td>
</tr>
<tr>
<td></td>
<td>Backing Collision Warnings</td>
<td>Electronic Onboard Recorders (EOBRs)</td>
</tr>
<tr>
<td></td>
<td>Automatic Speed Control</td>
<td>Vehicle Condition Monitoring (including remote sensing)</td>
</tr>
<tr>
<td></td>
<td>Electronic Drivers License</td>
<td>Enhanced Trailer Conspicuity</td>
</tr>
<tr>
<td></td>
<td>Intelligent Lighting Systems</td>
<td>Enhanced Trailer Rear Lighting</td>
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<tr>
<td></td>
<td>Enhanced Forward Lighting</td>
<td>Video Side Mirrors</td>
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<tr>
<td></td>
<td>Intersection Collision</td>
<td>Collision Aggressivity</td>
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<tr>
<td></td>
<td>Avoidance Systems</td>
<td>Reductions</td>
</tr>
<tr>
<td></td>
<td>Road Condition Warning Systems</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electronic Stability Control</td>
<td></td>
</tr>
</tbody>
</table>
Some Additional Systems of Importance for Passenger Vehicles

- Emergency Brake Assist (to apply full force)
- Improved Crashworthiness & Occupant Protection
  - Advanced Restraints
  - Improved Crashworthiness of Low-Speed Vehicles
  - Ejection Mitigation
  - Improved Side Impact Protection
  - Pop-Up Hoods for Pedestrian Impacts
  - Compatibility Between Vehicles & Roadside Guards
  - External Airbags
Large trucks are the *platform of choice* for early applications of many advanced safety technologies.

For many vehicle-based crash countermeasures, combination-unit trucks (CTs) have the greatest per-vehicle crash reduction benefits.
Truck Braking, Handling, & Stability

- **Improved Brakes**
  - E.g., Air Disc Brakes
  - New NHTSA rule to reduce stopping distance by 30%
  - Other enhancements (e.g., ABS, brake stroke monitoring, etc.)

- **Electronic stability control**

- **Rollover warnings & controls**

Courtesy Bendix
Rollover Warnings & Control
Vehicle Monitoring & Automated Functions

- Vehicle Condition Monitoring (& Remote Inspection)
- Onboard Weighing Systems
- Tire Pressure Monitors
- Speed Limiters (may become mandatory on trucks)
- Automatic/Automated Transmissions
- Electronic Data Recorders (e.g., for crash reconstruction)
- Electronic Onboard Recorders (EOBRs, for Hours-of-Service compliance monitoring)
Integrated Vehicle-Based Safety Systems

- Cross-system standardization & integration needed to reduce system conflicts & human error.
- Recent field tests with both cars and trucks
- Initial Systems:
  - Forward Collision Warning
  - Side Object Detection (for lane changes/merges)
  - Lane Departure Warning
Integrated Vehicle-Based Safety System (IVBSS)

Truck System Configurations

- Radar
- Vision

Lane-change/Merge (LCM)
Forward Crash Warning (FCW)
Lane Departure Warning (LDW)

* Sensor field-of-view depth not to scale
# Large Truck Safety Technologies: Estimated Benefit-Costs*

<table>
<thead>
<tr>
<th>Vehicle-Based Crash Avoidance System</th>
<th>Median ROI per $1.00</th>
<th>Median Payback Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward Collision Warning</td>
<td>$4.28</td>
<td>23 months</td>
</tr>
<tr>
<td>Lane Departure Warning</td>
<td>$3.96</td>
<td>23 months</td>
</tr>
<tr>
<td>Roll Stability Control</td>
<td>$5.51</td>
<td>18 months</td>
</tr>
</tbody>
</table>

Truck Driver Onboard Safety Monitoring
Same Sensors, Separate Behavioral Intervention

- Active Safety Real-Time Feedback
  - Forward Collision Warning (Headway & Proximity)
  - Roadway Departure
  - Speed, Acceleration, Braking
  - Driver Alertness & Performance
## IIHS Fatal Crash Prevention Estimates

<table>
<thead>
<tr>
<th>SYSTEM</th>
<th>Pass Vehicle FATAL CRASHES</th>
<th>TRUCK FATAL CRASHES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward Collision Warning</td>
<td>879</td>
<td>115</td>
</tr>
<tr>
<td>Lane Departure Warning</td>
<td>7,529</td>
<td>247</td>
</tr>
<tr>
<td>Side View Assist [Side Object Detection]</td>
<td>393</td>
<td>79</td>
</tr>
<tr>
<td>Adaptive Headlights</td>
<td>2,484</td>
<td>Not assessed</td>
</tr>
<tr>
<td>Electronic Stability Control</td>
<td>Not assessed</td>
<td>439</td>
</tr>
<tr>
<td>Total Unique Crashes</td>
<td>10,238</td>
<td>835</td>
</tr>
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</table>

Source: Jermakian, Insurance Institute for Highway Safety, 2010
An onboard safety technology must:

- Be truly **applicable** to the crash problem.
- Be **usable** by drivers and **acceptable** to them.
- Be **durable** & **reliable**.
- Be **maintainable**.
- Be **compatible** with legal, institutional, and cultural factors (e.g., do not create increased **liability**.)
- Actually result in:
  - Driving **behavior change**.
  - Crash **problem reduction** (number and/or severity).
- Be **affordable**.
- Be **marketable**.
- **A system is a chain**: **all links must be strong!**
Discussion Questions

- What did we not list in terms of key challenges?
- What are some ways to expand the use of proven countermeasures?
- What are the new opportunities for vehicle safety?
- How do we promote partnerships and increase coordination?
- How can current programs be adapted to better meet needs?
Summary of Key Points
How Can You Be Involved?

- Join the Stakeholder Group to Provide Additional Input and Feedback Throughout the Process:
  - Contact Kelly Hardy at khardy@aashto.org
- Additional Webinars
- Website to Be Developed
Webinars

- Safety Culture – June 1
  - https://admin.na3.acrobat.com/_a55098539/p14229897/
- Safer Infrastructure – Webinar June 10
- Safer Vehicles – Today’s Webinar June 21
- Road Users – Webinar June 30
  - Safer Drivers
  - Safer Vulnerable Users