Remarks prepared for

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National Highway Traffic Safety Administration

SAE World Congress

"Creating Safety Connections:
Technology, Data, and Behavior"

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Good morning and thank you for the opportunity to speak today. It's a pleasure to participate in the SAE World Congress.

As you know, at the National Highway Traffic Safety Administration we focus on reducing highway fatalities both domestically and internationally. Our contributions to improving highway safety address a

broad array of factors that include driver behavior, roads and infrastructure, vehicle testing, and emerging automotive technology.

Our safety goal is to save lives, prevent injuries, and reduce economic costs due to road traffic and non-traffic crashes—through research, education, safety standards, and enforcement activity.

The foundation of our efforts is a data-driven and research-oriented focus that touches on every aspect of driving safety. We envision, and are working to create, a new safety era that will revolve around safe vehicle designs and emerging technologies.

At the same time we keep a constant focus on driver behavior—such as speeding, distraction, seat belt use (or lack of use), and driving drunk. Because driver error

is a factor in over 90 percent of crashes in the United States, NHTSA generates a continuous stream of education and public awareness messages. For example, April is both Alcohol Awareness Month and National Distracted Driving Awareness Month.

In 2012, in addition to our core activities, we are emphasizing advanced safety technologies, pedestrian safety, the risk of death and injury to children being left behind in hot cars, and the central role of the agency's data analysis infrastructure.

This morning I want to focus on how NHTSA creates safety connections across a broad agenda that includes government initiatives, technological and research innovations, and the challenges of human behavior.

I'll start by highlighting our role in the Administration's long-term initiative to significantly boost fuel efficiency in the U.S. vehicle fleet.

In July 2011, President Obama announced an historic agreement with 13 major automobile manufacturers to increase fuel economy standards each year from 2017 to 2025, which the Administration estimated would require 54.5 miles per gallon equivalent for cars and light-duty trucks by Model Year 2025, if all of the improvements are made with fuel economy-increasing technologies.

Transforming our vehicle fleet into a more fuel efficient fleet will conserve energy, help protect the environment, and reduce our dependence on foreign oil.

After three decades without significantly raising fuel-efficiency requirements, NHTSA and the Environmental Protection Agency have developed the first-ever national program that harmonized fuel economy and greenhouse gas standards for light-duty vehicles for model years 2012 through 2016.

Under those standards, we estimate that passenger cars and light trucks would be required, on average, to increase from 27.6 miles per gallon in 2011 to 34.1 miles per gallon in 2016. The impact of this increased fuel efficiency is huge because light-duty vehicles are responsible for about 60 percent of U.S. transportation petroleum consumption.

We have also proposed fuel efficiency and greenhouse gas emissions standards through model year 2025. DOT and the EPA worked closely with auto manufacturers,

the state of California, environmental groups, and other stakeholders to help ensure that the standards we proposed are achievable, cost-effective, and preserve consumer choice.

NHTSA's proposal would increase the stringency of standards for passenger cars by an average of over four percent each year for Model Years 2017 through 2025. Standards for pick-ups and other light-duty trucks would increase an average of nearly three percent annually for the first five model years and an average of over four percent annually for the last four model years. Only the standards for Model Years 2017 through 2021 will be binding due to the statutory limitation on the number of model years for which legally binding standards can be set by NHTSA in a single rulemaking. The nonbinding standards for the remaining years are intended to aid manufacturers' planning.

These programs—combined with the model year 2011 CAFE standards and together spanning model years 2011 to 2025—are expected to dramatically cut the amount of oil we consume and the carbon pollution we generate from cars and trucks.

The Model Year 2017-2025 proposal, combined with other steps the Administration has taken to increase light-duty vehicle energy efficiency, is estimated to:

- **Save American drivers more than $1.7 trillion at the pump by 2025.**
- **Reduce America's dependence on oil by an estimated 12 billion barrels over the lifetime of the vehicles, and, by 2025, reduce oil consumption by 2.2 million barrels per day—enough to offset almost a quarter of the current level of our foreign oil imports.**

- **Slash six billion metric tons in greenhouse gas emissions over the life of the Administration's programs.**

NHTSA, and the industry, has worked on crashworthiness issues for over 40 years. We have made great strides protecting occupants in crashes and will continue to maintain this area of focus. At the same time, we recognize that crash avoidance technologies have a strong potential to improve safety. The best protection against a crash is to prevent it from happening in the first place.

Electronic Stability Control is a good example of that. In 2009, ESC saved an estimated 684 lives among passenger vehicle occupants. Since September 1, 2011,

all new passenger vehicles must be equipped with ESC. As the overall passenger vehicle fleet becomes increasingly equipped with ESC, the lives-saved estimate will continue to rise.

We are now extending our work on ESC to the heavy vehicle sector—and our research has shown that ESC will have a powerful impact on safety in the trucking and motor coach industries. About two-thirds of all heavy truck occupant fatalities occur in rollover crashes. Heavy vehicle loss-of-control and rollover crashes are also a significant cause of traffic tie-ups, resulting in millions of dollars of lost productivity and excess energy consumption each year.

NHTSA has now completed a comprehensive performance evaluation of ESC on tractors and motorcoaches; developed a cost-benefit analysis

utilizing computer simulation and modeling tools; and developed effective test procedures and performance criteria.

At this stage, ESC seems like an "old" technology compared to what is coming. NHTSA believes that crash avoidance systems, including the use of vehicle-based sensors to provide warning and automatic braking in forward collisions, have the potential to build upon the foundations of ESC to aid the driver and reduce crashes.

And beyond that, Vehicle-to-Vehicle communication will be the next wave of technologies . This suite of technologies has the potential to address approximately 80 percent of the vehicle crash scenarios involving unimpaired drivers.

Our research shows that these technologies could help prevent a majority of the collisions that typically occur in the real world, such as rear-end collisions, intersection crashes, or collisions while switching lanes.

NHTSA has been conducting vehicle performance testing to evaluate the technical effectiveness of these technologies. NHTSA Vehicle research and Test Center, along with industry partners through the CAMP organization, has conducted a large program of work on functionality and interoperability of these technologies. This testing continues, and the results to date are very positive. This is a great example of how government and industry can work together to develop and assess technology to address safety issues.

Additionally, beginning in 2011, NHTSA has been conducting Safety Pilot driver clinics in the first phase of

a two-part research program jointly developed with the Research and Innovative Technology Administration (RITA) in coordination with other DOT agencies.

The driver clinics are designed to evaluate cars and trucks equipped with vehicle-to-vehicle communications systems in a controlled environment where researchers can observe the drivers' responses. The technologies we've been testing include in-vehicle collision warnings, "do not pass" alerts, warnings that a vehicle ahead has stopped suddenly, and other similar safety messages.

These clinics have expanded our understanding of how drivers will respond to the technology and how connected vehicles communicate in real-world

scenarios. A second phase of Safety Pilot using approximately 3,000 vehicles will further test Connected Vehicle technology in a real world field test and demonstration from summer 2012 through summer 2013. It will focus on vehicle-to-vehicle applications, in addition to continuing the research on a limited number of vehicle-to-infrastructure communication systems.

The information collected from both the vehicle performance testing and the Safety Pilot will be used by NHTSA to determine by 2013 whether to proceed with additional vehicle-to-vehicle communication activities, including possible future rulemakings.

In recent years I have been pleased to report overall declines in U.S. highway traffic fatalities. Our latest data show that in 2010 US highway fatalities fell to 32,885,

the lowest level since 1949, despite an estimated increase of nearly 21 billion miles traveled. Since 2005, fatalities have dropped 25 percent. And while the trend is very encouraging, for all of us at NHTSA the number of lives lost annually is still much too high.

The outlook is quite different in the developing world, where traffic crashes claim the lives of nearly 1.3 million people every year, and injure 20-50 million more. Yet only 15 percent of developing countries have comprehensive laws that address the key risks of speeding, drinking and driving, and the non-use of helmets, seat belts, and child restraints. From NHTSA's perspective, creating the new safety era that I mentioned earlier is ultimately an international undertaking.

The 2009 WHO Global Status Report on Road Safety helped to focus the world's attention on this global crisis. It is now clear that data collection and analysis are the tools that can help us prevent traffic deaths in the developing world. And the nations that have experience addressing road safety issues through systematic data-based methods can be effective leaders in advancing this important work.

In 2010, NHTSA conducted a pilot training program to assist developing nations in implementing the types of data systems described in our new Dta System manual. Argentina, India, Indonesia, Jordan, Kenya, and Vietnam participated in the pilot. We are now using this experience to revise and develop a similar training event in Vietnam in Fall, 2012.

The purpose of the training event will be to increase understanding of road traffic data systems and evaluation, and to impart the value of reliable and up-to-date data for policymakers. Participants will learn to improve and strengthen the collection and evaluation of traffic and road safety data systems in their own economies. They will also learn how to leverage data to develop and implement effective countermeasures and effective traffic safety policies.

NHTSA also maintains numerous international partnerships in support of highway safety regulations. One recent example, announced last November, is the joint U.S. Japanese, European Commission plan to work toward a Global Technical Regulation (GTR) on electric vehicle safety.

Based on the level of risk of safety issues associated with electric vehicles and their components, NHTSA is committed to clear provisions and test protocols to ensure that the electrical components perform safely and are appropriately protected while in use, recharging, and after a crash or other catastrophic event.

NHTSA is also engaged in domestic electric vehicle safety in the United States, assessing the performance and functional requirements of battery/electric storage systems. Our failure analysis research is focused on the problems that can occur in lithium-ion batteries and the severity of their occurence. We are dedicated to advancing our EV research and exploring potential rulemaking in this area.

Our highway safety work often leads us to the interfaces between driver behavior and emerging technologies. Let me conclude with two examples.

Distracted driving is one of the newest and deadliest threats on our agenda. In 2010, more than 3,000 people in the United States lost their lives in crashes where distraction was a factor. Young people are especially vulnerable because their culture is thoroughly defined by mobile technologies and social connectivity.

The data are telling us that as technology evolves, the potential for distraction in vehicles rises. We're seeing the rapid growth of new dashboard and handheld infotainment systems in vehicles that create previously unheard of and dangerous levels of distraction with deadly unintended consequences. We know that drivers dialing a cell phone, texting, or surfing the Internet are

diverting themselves from their primary responsibility: driving.

In response, NHTSA has advanced an evaluative framework for in-vehicle technologies. It offers specific guidance to automakers to help them develop electronic devices that provide the features consumers want—without interfering with the driver's focus or sacrificing safety by distracting the driver's attention.

Our phase-1 draft guidelines recommend that manufacturers design their interfaces to limit the amount of time that drivers take their eyes off the road or hands off the wheel while operating in-dash or in-car technology. We also suggest that functions that require intensive visual-manual interaction by the driver (such as sending a text or posting to Facebook as examples) should be disabled unless a vehicle is in park. Phase-2

guidelines will cover mobile and aftermarket devices if, and when, they are being used by the driver. Phase-3 guidelines will cover devices that are voice-operated.

Last month we held three public hearings on our proposed distracted driving guidelines across the United States and gathered responses from various stakeholders. We look forward to a collaborative solution that directly addresses the dangerous connection between electronic devices and driver distraction.

Let me turn now to alcohol-impaired driving, one of the most prevalent, yet preventable, traffic safety problems facing our nation. In 2009, 10,839 people died nationwide in crashes involving a drunk driver. Alcohol-

impaired-driving fatalities accounted for 31 percent of overall traffic fatalities in 2010.

Like distracted driving, alcohol-impaired driving is especially prevalent among young people. In 2009, 8,976 people aged 21 to 34 were killed in motor vehicle traffic crashes. Of those, 47 percent (4,206) were killed in alcohol-impaired driving crashes.

In addition to our longstanding awareness and enforcement campaigns to reduce these fatalities, NHTSA initiated a $10 million, five-year cooperative research program in 2008 with the Automotive Coalition for Traffic Safety (ACTS), a nonprofit industry coalition funded by 17 automakers to address the problem. This is another great example where

government and industry have partnered to address safety issues.

The Driver Alcohol Detection System for Safety (DADSS), is developing non-invasive technologies to quickly and accurately measure a driver's blood alcohol concentration (BAC). If the system detects that the driver has a BAC at or above the legal intoxication limit (.08 BAC or higher), the vehicle will be disabled from being driven. Technologies developed under this project are envisioned to be voluntarily installed as an option on new cars.

NHTSA research shows that drivers involved in fatal crashes with blood alcohol levels above the .08 legal

limit are eight times more likely to have had a prior conviction for impaired driving than drivers who had no alcohol in their bodies at the time of a crash.

A comprehensive impaired driving program needs to include deterrence, prevention, communications, and treatment in order to address the general population as well as those who are problem drinkers. Today I'll focus on the development of the technology that can prevent alcohol-impaired driving.

The R&D effort was structured to manage risk through a phased approach. We are now in the first year of a two-year development which began in the third quarter of 2011. This development phase will move the technology beyond proof-of-concept devices.

In late 2013, a research vehicle will be available that will showcase two different approaches to measuring driver alcohol levels—a touch-based approach that assesses alcohol in human tissue and a breath-based approach enabling assessment of alcohol concentration in the driver's exhaled breath.

In the touch-based approach, measurement begins by shining a near infrared light (similar to a low power flashlight) on the user's skin. This light contains information on the tissue's unique chemical properties, which can be analyzed to determine the tissue alcohol concentration.

The breath-based approach enables a quick, contact-free measurement of the driver's breath alcohol content by using the concentrations of carbon dioxide

as a measure of dilution of the driver's exhaled breath. Sensors placed in the vehicle cabin will allow the system to ensure that the breath sample is from the driver and not a passenger.

Although impressive progress has been made to date in Phase I of the program (where proof-of-principle prototypes were focused on speed, accuracy, and precision), significant additional development is needed. The next challenge is to improve accuracy and decrease measurement time to meet or exceed DADSS performance specifications.

DADSS devices will also be required to meet the automakers' standards for long-term reliability and durability and must be compatible for mass-production.

For touch-based technology, a sensor redesign is underway to meet the rigors of the vehicle environment, including size and ruggedness requirements. For breath-based technology, additional sensor development is needed. Optimal sensor locations will be identified based on human breath aerodynamics in the vehicle, across a wide variety of environmental conditions. The challenge will be to locate sensors in the vehicle cabin to ensure that the breath sample is at the required dilution. For this technology, if alcohol is detected on the driver's breath at a pre-set BAC, the driver will be asked to provide a short puff of breath directly toward the sensor to achieve the required accuracy and precision.

The program is now in Phase Two, which will conclude in late 2013 with a practical demonstration of the

DADSS alcohol detection systems in a research vehicle. These systems, while still research prototypes, will be suitable for continued development and subsequent vehicle testing.

Although DADSS research is still in the early stages, we are following a step-by-step, data-driven process to ensure that the end result is a highly unobtrusive, accurate, and precise system. The Automotive Coalition for Traffic Safety has also formed a Blue Ribbon Panel of experts to advise the project, including automotive manufacturers and suppliers, public interest organizations, highway safety researchers, domestic and international government agencies, and medical and behavioral scientists.

There is still much more work to be done, but we believe that a technology could potentially be ready for general use and integrated into vehicles in eight to 10 years.

We look forward to a great conference, with great discussions on how, together, we can continue to work together to address safety issues and reduce the unacceptable numbers of injuries and fataltities on our roads.

Thank you.