Remarks Prepared for

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National Highway Traffic Safety Administration

Leadership in Transportation: New Perspectives on Safe and Sustainable Transportation

University of Michigan

Transportation Research Institute

"Fueling the Transportation Transition"

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Thank you, Peter [Peter Sweatman, Director, UMTRI] and/or Chuck [Chuck Gulash, Director, Toyota Collaborative Safety Research Center (CSRC)].

I am truly honored to be with all of you today. UMTRI and CSRC are both impressive contributors on the cutting edge of transportation research.

Whenever I come to Ann Arbor, I invariably receive an abundance of news, data, and information straight from the source. It's overstimulating in the best possible way. And no matter how long it takes me to do it, I'm always in a better place once I've connected the dots.

This afternoon I want to speak about how innovative transportation research is "fueling a transportation transition" that's remaking our industry by revising our expectations for safety and expanding our vision of where research can take us in the future.

As NHTSA Administrator, it's been my privilege to see the remarkable work generated by research institutions in the private sector, government, and academia.

Through emerging research and data from many contributors, our community is generating new knowledge that's being practically—and rapidly—applied to reduce highway fatalities and injuries.

Research today is truly driving new levels of innovation and progress. It's providing us with a deeper understanding of crash causation. It's enabling us to build vehicles that are safer and smarter. It's advancing the sciences of crash avoidance and vehicle interconnectivity, as well as the development of autonomous vehicles.

We all know that safety innovations are not created overnight. They emerge from dedicated research, collaboration, and investment—and I am so proud of our tremendous shared history of developing, testing, and implementing lifesaving technologies.

Our community has pioneered advances in air bag technologies and development of next-generation crash-test dummies. Our work through NCAP has incentivized safety, which has translated into important manufacturer innovations and crash avoidance technologies such as Electronic Steering Control and Lane Departure Warning.

NHTSA's research vision is integrated with our safety partners and the broader transition that's now emerging. One compelling example that

you're familiar with is the vehicle-to-vehicle research now underway in Ann Arbor.

Since 2011 NHTSA has been working with the Research and Innovative Technologies Administration (RITA) Intelligent Transportation Systems Joint Program Office and industry partners from the Crash Avoidance Metrics Partnership on testing the next generation of vehicle-to-vehicle communications.

This technology has the potential to address approximately 80 percent of the vehicle crash scenarios involving unimpaired drivers. It could also enhance intelligent management of roadway traffic and reduce the burden of highway traffic on the environment.

NHTSA's Safety Pilot driver clinics have measured how drivers respond to in-car collision warnings generated via Dedicated Short Range Communications technology: "Do not pass" alerts, warnings that a vehicle ahead has stopped suddenly, and similar safety messages. We've found that 9 out of 10 of participating drivers have a highly favorable opinion of this technology.

In late August, Secretary LaHood launched the second phase of our V2V testing right here in Ann Arbor, with nearly 3,000 cars, trucks, and buses equipped with V2V communications technology. This real-world field test will continue through the summer of 2013. NHTSA plans to make a decision about the Agency's next steps for vehicle to vehicle technology for

passenger vehicles in 2013 and for large commercial vehicles in 2014.

I'm extremely excited about this research. For me, preempting crashes is the North Star of highway safety. While NHTSA maintains its focus on crashworthiness issues, crash avoidance technologies and active safety offer amazing—and perhaps unprecedented—potential for achieving large reductions in the number of fatal crashes.

Clearly, the best protection against a crash is to prevent it from happening in the first place. Now, in this dynamic period of transition, the emergence of automated vehicle technologies is sharpening our focus on the one component for which NHTSA cannot mandate a recall: the human factor.

For automated driving to be successful, we must have reliable technology and fulfill requirements for safety, privacy, security, and consumer acceptance. We must also develop performance specifications and non-traditional methods to validate the performance of a high level of automated driving where the vehicle is making decisions for the driver in complex driving situations.

Currently, there are no developed methods for meeting this challenge. We may have to depend on modeling and simulation of detailed traffic interactions that lead to crashes.

We certainly need to understand and develop standards and methods of operation that accommodate distinct levels of automated

control that balance the roles of the driver and the machine, culminating in fully automated driving:

- **We're all familiar with Assisted Automation, where the driver has complete authority, but cedes limited fundamental control to the vehicle in certain normal driving or crash-imminent situations—such as enhanced steering control, automatic braking, adaptive cruise control, or lane keeping.**

- **In Monitored Automation, authority is shared: The driver cedes primary control, but is still responsible for monitoring and safe operation and is expected to be available at all times.**

- **In Conditionally Automated driving, the driver can cede full control authority under certain traffic and environmental conditions, but is expected to be available for occasional control. The car is responsible for safe operation. We consider the current Google concept to be in this category.**

- **In the Fully Automated mode, the driver provides destination or navigation input, but is not expected to be available for control. Responsibility for safe operation rests solely on the automated systems.**

We know of no such vehicle being designed for civilian highway use at this time. But I am confident that automation research efforts soon will open the way for this transition. For our part, NHTSA has been having extensive

discussions with Google and numerous car makers about plans to deploy this technology and the issues that we believe are going to be important to its safe introduction.

Here's a partial list:

- **Anticipating how automated and non-automated vehicles will respond to each other.**
- **Understanding and evaluating driver behavior in these vehicles**
- **Developing performance requirements for the highly complex potential crash environments that they will encounter**
- **Ensuring that the systems (including sensors, maps, and software) are effective and reliable**
- **Meeting the challenges of regulating these vehicles**

- **Investigating the potential for this category of technology to contribute to intelligent management of roadway traffic and reduce the burden of highway traffic on the environment.**

From NHTSA's perspective, the potential benefits of this technology strongly support the continued exploration of automated driving. I can't wait to see how this extremely worthwhile endeavor unfolds.

I'd like to say a few words about the importance of data tools that are emerging as drivers of the transition we're experiencing in transportation.

At NHTSA, our work relies on careful engineering, sound science, and good data. We're currently engaged in a modernization

effort to make sure our data systems are as robust as possible—and that they support our capacity to gather the information we need to understand existing and evolving traffic safety challenges.

Through our Data Modernization (DataMod) Project, we're working to affirm NHTSA's position as the leader in motor vehicle crash data collection and analysis, by collecting quality data to keep pace with emerging technologies and policy needs.

Congress appropriated $25 million to fund modernization of the National Automotive Sampling System (NASS) data collection system, which was originally designed in the 1970s. Congress was specific in what they

would like NHTSA to consider when updating the system:

- **Enlarge the sample size.**
- **Expand the scope of data collection to possibly include large trucks, motorcycles, and pedestrians.**
- **Assess the need for more data from the pre-crash, crash, and post-crash phases.**
- **Review the crash data elements to be collected.**

Individuals and offices across NHTSA are working on this very important multi-year project. The target for implementation is January 1, 2016.

NHTSA is now focusing on naturalistic data as a resource for better understanding the behaviors

that contribute to crashes or avoid crashes. Naturalistic studies provide us with new views of driving-in-progress and can be a valuable complement to crash data.

Instrumentation suites that capture naturalistic driving behavior provide a rich perspective on the complex connections between driver behavior and crashes. Observing people while they're driving reveals new insights into the factors affecting driving safety.

One of the best examples of this research in recent years is the Strategic Highway Research Program (SHRP) 2 Naturalistic Driving Study conducted by the Transportation Research Board.

SHRP2 is the largest ever naturalistic driving study for understanding the interaction among the key factors involved in highway crashes—driver, vehicle, and infrastructure. The data collected under SHRP 2 will provide new information relevant, for example, to driver behavior at intersections and during lane changes.

NHTSA proposes to use this database to further our knowledge of the risks associated with aggressive driving, drowsy driving, and speeding—as well as the manual, visual, and cognitive sources of driver distraction.

We're all working in a rapidly evolving, dynamic era that calls on the research community to bring flexibility, imagination, and above all a

collaborative spirit to the next steps in our transition.

I want to conclude by thanking all of you for your tremendous work over the years. The academic research community has been a valued partner and a dynamic contributor to our advance across the frontiers of transportation technology and vehicle safety.

I can't imagine where we would be without your contributions. And I don't have to—because I'm looking forward to our work continuing, today and into the future.

Thank you.