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Research Goals

- Employ advanced V2V wireless technologies to reduce, mitigate, or prevent 81% of light-vehicle crashes by unimpaired drivers.
- Establish robust DSRC standards for safety-critical applications.
- Accelerate in-vehicle technology to ensure value to the first V2V vehicles.

Research Outcomes

- The planned outcome of this research is to document and validate potential benefits of V2V technologies, and to develop the factual evidence needed to support U.S. DOT decision-making regarding a 2013 NHTSA agency decision.



U.S. DOT

Transforming the nation's transportation system through vehicle-to-vehicle connectivity can provide significant safety benefits.

Vehicle-to-Vehicle (V2V) Communications for Safety

INTRODUCTION

Vehicle-to-Vehicle (V2V) Communications for Safety is the wireless exchange of data among vehicles traveling in the same vicinity which offers opportunities for significant safety improvements.

V2V is a key research program of the Intelligent Transportation Systems Joint Program Office (ITS JPO) within the U.S. Department of Transportation's (U.S. DOT) Research and Innovative Technology Administration (RITA).

Through the multimodal program, the ITS JPO and the private sector are able to share information between vehicles to achieve transformative safety benefits to the multimodal transportation sector.

VISION

The vision for the U.S. DOT's V2V Communications for Safety research program is that each vehicle on the roadway will eventually be able to communicate with other vehicles, and that this rich set of data and communications will support a new generation of active safety applications and systems.

RESEARCH PLAN

The four major objectives of the V2V safety research program are:

1. Develop V2V active safety applications that address the most critical crash scenarios.
2. Develop a rigorous estimation of safety benefits that will contribute to the assessment of a 2013 NHTSA agency decision.
3. Work with industry and enable market factors that will accelerate V2V benefits through in-vehicle V2V technologies and through the use of aftermarket and/or retrofit options to ensure that the first V2V-equipped vehicle owners find value in their investment.
4. Building from the results of the VII program's proof-of-concept tests, complete the development and testing of the V2V communications technologies and standards.

MULTIMODAL

The V2V research program incorporates a collaborative research process that engages the appropriate stakeholders in a multi-track program to address the breadth of technical and non-technical V2V research needs. Critical policy issues are also being addressed with this research, which will be useful as wide-scale deployment approaches.



RESEARCH TRACKS INCLUDE:

Track 1 - Identification of critical crash scenarios for V2V has been completed. Initial benchmarks for safety application function, performance, and effectiveness have been developed.

Track 2 - Ensure interoperability and determine supporting infrastructure needs for V2V deployment. Safety applications must work on all types of equipped vehicles and adhere to communication standards to ensure security and message integrity.

Track 3 - Develop rigorous estimates of safety benefits. The development of performance measures, objective test procedures, and an adaptation of Advanced Crash Avoidance Technologies (ACAT) will assist in validating safety benefits.

Track 4 - Develop prototype active safety applications and evaluate through objective tests and field trials. The development of these applications is dependent upon and assists in the analysis of the functional and performance requirements for the underlying technologies, such as positioning and communications. However, additional research needs to be conducted to address more complex crash scenarios for a number of additional scenarios. An additional effort under this track will be the cooperative research and development of a safety application with European Union partners.

Track 5 - Develop effective driver vehicle interfaces. Collision warning system effectiveness relies on the quality of its interface, which can affect the driver's performance

Track 6 - Investigate policy issues and formulate regulatory decisions within the context of the broader program.

Track 7 - Develop and evaluate V2V safety applications that incorporate the unique needs and vehicle dynamics of commercial vehicles, large trucks, and motor coaches. NHTSA estimates V2V applications can address 71% of all heavy truck crashes involving unimpaired drivers. Other applications for commercial vehicle operators will also be evaluated.

Track 8 - Develop transit safety applications. Utilizing the work done on automobile safety applications and transitioning its applicability to transit vehicles could positively impact the industry.

WORK IN PROGRESS

Human Factors Research

The ITS JPO has established a Human Factors Research effort to study the effects of alerts and warnings on drivers and travelers throughout the transportation system to assess the human side of response to the in-vehicle alerts and warnings. They will be looking to develop effective driver vehicle interfaces which will further be explored through the Safety Pilot driver clinics.

Safety Pilot

A large scale Safety Pilot driver clinic, incorporating many of the technical and non-technical tracks identified in the ITS Strategic Research Plan, 2010-2014 will be conducted with approximately 2,500-3,000 vehicles equipped with transmit devices in early 2011.

Standards

Data and communication standards have been developed through this research effort including the SAE J2735 Basic Safety Message; a standard communications architecture/ platform communicating in the 5.9 GHz band of radio spectrum.



Potential V2V Safety Applications include safety warnings for drivers

- emergency brake light warning
- forward collision warning
- intersection movement assist
- blind spot and lane change warning
- do not pass warning
- control loss warning
- vehicle stabilization activation on roadways alerting transit operators to weather-related information



A connected vehicle network can vastly improve system-wide safety

To learn more about the V2V Safety program, contact:

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