

The NHTSA Senior Associate Administrator signed the following advance notice of proposed rulemaking and we are submitting them for publication in the Federal Register. While we have taken steps to ensure the accuracy of this Internet version of the proposal, it is not the official version of the proposal.

Please refer to the official version in a forthcoming Federal Register publication, which will appear on the Government Printing Office's FDSys website (<http://fdsys.gpo.gov/fdsys/search/home.action>) and on Regulations.gov (<http://www.regulations.gov>) in Docket No. NHTSA-2014-0022.

Once the official version of this document is published in the Federal Register, this version will be removed from the Internet and replaced with a link to the official version.

## **DEPARTMENT OF TRANSPORTATION**

### **National Highway Traffic Safety Administration**

**[Docket No. NHTSA-2014-0022]**

**RIN 2127-AL55**

#### **Federal Motor Vehicle Safety Standards: Vehicle-to-Vehicle (V2V) Communications**

**AGENCY:** National Highway Traffic Safety Administration (NHTSA), Department of Transportation (DOT)

**ACTION:** Advance notice of proposed rulemaking (ANPRM); notice of availability of technical report.

**SUMMARY:** This document initiates rulemaking that would propose to create a new Federal Motor Vehicle Safety Standard (FMVSS), FMVSS No. 150, to require vehicle-to-vehicle (V2V) communication capability for light vehicles (passenger cars and light truck vehicles (LTVs)) and to create minimum performance requirements for V2V devices and messages. The agency believes that requiring V2V communication capability in new light vehicles would facilitate the development and introduction of a number of advanced vehicle safety applications. Some crash warning V2V applications, like Intersection Movement Assist (IMA) and Left Turn Assist (LTA), rely on V2V-based messages to obtain information to detect and then warn drivers of

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

possible safety risks in situations where other technologies have less capability. Both of those applications address intersection crashes, which are among the most deadly crashes that U.S. drivers currently face. NHTSA believes that V2V capability will not develop absent regulation, because there would not be any immediate safety benefits for consumers who are early adopters of V2V. V2V begins to provide safety benefits only if a significant number of vehicles in the fleet are equipped with it and if there is a means to ensure secure and reliable communication between vehicles. NHTSA believes that no single manufacturer would have the incentive to build vehicles able to “talk” to other vehicles, if there are no other vehicles to talk to – leading to likely market failure without the creation of a mandate to induce collective action.

Through this notice, and through the accompanying technical report, “Vehicle-to-Vehicle Communications: Readiness of V2V Technology for Application,” NHTSA presents the results of its initial research efforts. In this report, NHTSA has done a very preliminary estimate of the costs of V2V and the benefits for two V2V-based safety applications, IMA and LTA, for addressing intersection crashes and left-turning crashes, respectively. The report also explores technical, legal, security, and privacy issues related to the implementation of V2V. NHTSA seeks comment on the research report, and solicits additional information, data, and analysis that will aid the agency in developing an effective proposal to require new light vehicles to be V2V-capable. By mandating V2V technology in all new vehicles, but not requiring specific safety applications, it is NHTSA’s belief that such capability will in turn facilitate market-driven development and introduction of a variety of safety applications, as well as mobility and environment-related applications that can potentially save drivers both time and fuel.

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

**DATES:** Comments must be received no later than [INSERT DATE 60 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER].

**ADDRESSES:** Report: The research report is available on the internet for viewing in PDF format at <http://www.safercar.gov/v2v>, and at <http://www.regulations.gov>, Docket No. NHTSA-2014-0022. On [regulations.gov](http://www.regulations.gov), input this docket number into the search box on the home page and follow the link provided to find the report.

Comments: You may submit comments, identified by Docket No. NHTSA-2014-0022, by any of the following methods:

**Internet:** To submit comments electronically, go to <http://www.regulations.gov> and follow the online instructions for submitting comments. Alternatively, go to <http://www.safercar.gov/v2v/resources> and click the yellow button labeled “Submit comments on the 2014 V2V Light Vehicle Technical Report here” to go directly to the docket in [regulations.gov](http://www.regulations.gov).

**Facsimile:** Written comments may be faxed to 1-202-493-2251.

**Mail:** Send comments to Docket Management Facility, U.S. Department of Transportation, 1200 New Jersey Avenue, SE, West Building Ground Floor, Room W12-140, Washington, DC 20590.

**Hand Delivery:** If you plan to submit written comments by hand or by courier, please do so at U.S. Department of Transportation, 1200 New Jersey Avenue, SE, West Building Ground Floor, Room W12-140, Washington, DC between 9 a.m. and 5 p.m. Eastern Standard Time, Monday through Friday, except Federal holidays. You may call the Docket Management Facility at 1-800-647-5527.

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

Instructions: For detailed instructions on submitting comments and additional information see the Public Participation heading of the SUPPLEMENTARY INFORMATION section of this notice. Please note that all comments received will be posted without change to <http://www.regulations.gov>, including any personal information provided. Please see the Privacy Act heading under the Public Participation heading below for more information.

**FOR FURTHER INFORMATION CONTACT:** For technical issues: Gregory Powell, Office of Rulemaking, National Highway Traffic Safety Administration, at 202-366-5206. For legal issues: Rebecca Yoon, Office of the Chief Counsel, National Highway Traffic Safety Administration, at 202-366-2992.

#### **SUPPLEMENTARY INFORMATION:**

##### Contents

I.	Executive Summary .....	4
II.	Questions on which NHTSA Requests Further Information from the Public.....	5
III.	Public Participation .....	24
IV.	Rulemaking Notices and Analyses.....	27

#### **I. Executive Summary**

In early 2014, NHTSA announced its decision to move forward with the regulatory process for light duty V2V communication systems. This ANPRM announces the availability of the NHTSA research report, “Vehicle-to-Vehicle Communications: Readiness of V2V Technology for Application” which includes analysis of the Department's research findings in several key areas including technical feasibility, privacy and security, and preliminary estimates on costs and safety benefits and seeks comments on how NHTSA can best evaluate the need for

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

and likely effects of any mandate for V2V. NHTSA will use the responses to this ANPRM and the research report as part of our work to develop a regulatory proposal that would require V2V devices in new vehicles in a future year, consistent with applicable legal requirements, Executive Orders, and guidance.

NHTSA will also issue a Request for Information (RFI) in the near future to seek comments on whether any private entities may have an interest in exploring the possibility of constituting and operating a V2V Security Credential Management System (SCMS), get feedback on certain questions regarding the establishment of an SCMS, and obtain any other comments or information from the public on the issue of an SCMS. The RFI, when it is issued, will be available in Docket No. NHTSA-2014-0023.

## **II. Questions on which NHTSA Requests Further Information from the Public**

NHTSA invites comment on all aspects of the research report, in order to inform the agency as it works toward making the rulemaking proposal, but also has specific questions in each of the following areas evaluated as part of the research report. As a general matter, the agency requests that commenters provide as much research, evidence, or data as possible to support their comments, as that information will be of great assistance to the agency as it moves forward in the development of a proposed rule.

### **a. Safety need**

Section III of the research report discusses an analysis conducted to determine the potential Safety Need associated with V2V technology:

1. NHTSA intends to use additional V2V data collected from real-world test beds already being executed by DOT to continue to supplement our understanding of which crash

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

scenarios are most likely to be addressed by V2V technology. (Note: this question is different from that of possible benefits, discussed below, which goes to the likely effectiveness of the technology—the degree to which a crash risk will be reduced-- in a given scenario.) In the future, these same test beds will likely serve as early deployment sites for V2V and V2I. How might we use data from these test beds to inform our estimates of the likely target population for V2V in the real world? How might we use data from these test beds (or from our earlier 3000-car study) to inform our estimates of the likely benefits and costs of requiring V2V? Additionally, outside of using test beds or additional field operational trials, how can we better ensure that our evaluation accurately reflects, or permits valid conclusions about, the population of drivers, vehicles, and environments where V2V will be used if it is mandated on a nationwide basis?

2. We will also work with the General Services Administration (GSA) to determine which vehicles in the government fleet can be equipped with V2V devices for testing purposes, and to facilitate the early penetration of V2V technology into the on-road fleet. Who else is interested in outfitting a public or private fleet with V2V technology? How might we choose fleets for additional testing purposes to best reflect the demographics and characteristics of the driving public and the conditions under which they drive?
3. Do commenters believe that the agency correctly conducted its preliminary analysis of which types of crashes could potentially be addressed by V2V-based safety applications, as discussed in Section III of the report? If not, how would commenters suggest the agency change the analysis? Did the agency choose appropriate target crashes and pre-crash scenarios, or should it have excluded some or included others, and if so, which ones

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

and why? Did the agency appropriately account for societal costs (fatalities, injuries, property damage) associated with that target population, and if not, how else should the agency have evaluated those potential costs? Did the agency appropriately assess, for purposes of determining an appropriate target population, which crash scenarios can be addressed by V2V as opposed to some other crash avoidance technology, or should the agency have considered this issue differently? That is, in delineating which crash scenarios may be better addressed by V2V technology than by a vehicle-resident technology, was the report over- or under-inclusive?

4. Do commenters believe that V2V-enabled safety applications may evolve over time to address more and different pre-crash scenarios than the agency has accounted for in the preliminary analysis? If so, how would commenters suggest the agency attempt to evaluate the potential safety improvements associated with this evolution? If not, please provide evidence about why the agency's view concerning the evolution of this technology is mistaken.
5. Do commenters believe that the agency's preliminary analysis of the potential for V2V to address vehicle crashes, as summarized in Section III.B, seems accurate? If not, how would commenters suggest the agency change this analysis to more accurately estimate the likely safety improvements resulting from a nationwide requirement of V2V technology?

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

6. One concern when governments intervene in network goods markets is that they may choose the wrong technology or standard.<sup>1</sup> Is there a concern that by mandating V2V NHTSA may “crowd out” other promising technologies? How can NHTSA be sure that V2V is the most cost effective technology available?

**b. NHTSA’s exercise of its legal authority to require V2V**

7. In the report, NHTSA discusses how its current legal authority would apply to various technologies involved in the V2V system, including: integrated original equipment manufacturer (OEM) V2V technologies (including safety applications), integrated aftermarket equipment, non-integrated aftermarket equipment, software related to V2V, and certain roadside infrastructure. As discussed in the report, the agency is confident that its existing legal authority would cover all of the above categories to the extent necessary to ensure the success of the V2V system. Nevertheless, with regard to non-integrated aftermarket equipment and software related to V2V, the agency is interested in the public’s view regarding whether the agency has struck the correct balance in limiting its authority to only those devices or programs where a substantial portion of its suspected use is in conjunction with motor vehicles. Likewise, regarding roadside infrastructure, has the agency struck the correct balance if it were to limit its authority to items that are used concurrently with only one vehicle, rather than items that could be used by many vehicles at once?
8. The agency also discusses how its existing authority would apply in establishing an FMVSS mandating that new light vehicles be equipped with a dedicated short-range

---

<sup>1</sup> Oz Shy, *The Economics of Network Industries*, 2001.



*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

communications (DSRC) device, including a preliminary discussion of potential performance standards. The agency is interested in commenter's views on this discussion.

9. Likewise, the agency briefly discusses how a potential FMVSS for a safety application would generally be structured. Although less detailed than the discussion for a DSRC FMVSS, the agency is interested in commenter's views on this preliminary discussion.

**c. What's necessary for DSRC to work**

Throughout Section V of the research report, NHTSA identifies aspects of V2V technology that the agency describes as needing further research and development in order to transition to wide-scale V2V deployment.

10. Can V2V safety applications only be addressed through the use of DSRC devices, or is there some other method of communication that could be used?
11. Of the research needs identified in the report, do commenters believe that any of the descriptions should be modified to better support wide-scale implementation of V2V technology? If so, how should they be modified? Additionally, are there research needs that are not identified or addressed? If so, please identify those needs and suggest how the agency may address them.
12. Do commenters agree with the agency's preliminary conclusions about what should be included as part of the Basic Safety Message (BSM)? Are there any additional elements that should be included?
13. NHTSA currently does not plan to propose to require specific V2V-based safety applications. Rather, we plan to propose to require that new vehicles be equipped with

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

DSRC devices, which will enable a variety of applications that may provide various safety-critical warnings to drivers. Should vehicle manufacturers be allowed to choose what form of warning should be provided to drivers? Should drivers be able to modify or turn off any warnings that they receive?

14. NHTSA is considering including in its proposed rule technical standards for V2V communications, drawing heavily on standards under development by the auto industry. This may be necessary to ensure compatibility of all V2V devices, whether installed in new vehicles or made available in the aftermarket. How can NHTSA choose the correct standard(s) for V2V? Executive Order 12866 directs agencies to use performance-based standards whenever possible. Should NHTSA mandate a particular standard or only mandate V2V, but allow market participants to choose a standard? If you believe a standard should be chosen, how specific should the standard be? Should the standard mandate a particular form of communication? Should cellphones be an option for the communication or must V2V be a component of the vehicle? Does cellular technology have the low latency and security necessary for safety-critical communications?
15. Do commenters believe that the current standards for interoperability are mature enough to support the more wide-scale deployment of V2V devices, given that interoperability was achieved in the context of the Safety Pilot Model Deployment in Ann Arbor, Michigan?<sup>2</sup>
16. Section V of the research report discusses additional work on interoperability that the agency expects will be performed by voluntary standards organizations such as Society of

---

<sup>2</sup> Please see Section V of the research report for NHTSA's findings thus far with regard to interoperability.

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

Automotive Engineers (SAE), Institute of Electrical and Electronics Engineers (IEEE), International Standards Organization (ISO), etc., along with additional research underway by the agency itself. Do commenters believe that this research will be sufficient to facilitate interoperability for wide-scale V2V deployment, or do commenters believe that additional research is needed? If so, what additional research could be beneficial, and why?

17. Do commenters believe that the agency's preliminary assessment that V2V devices would require two DSRC radios, one for safety communications and the other for security-related communications, is accurate? If not, why not, and how do commenters suggest safety messages maintain priority?
18. The Federal Communication Commission (FCC) has proposed the possibility of sharing the DSRC frequency of 5.9 GHz with other unlicensed devices. What are the possible ramifications of this sharing on current safety applications and future applications that may be developed? If commenters believe that spectrum sharing in the 5.9 GHz frequency is feasible and will not interfere with V2V communications, can commenters provide research to support that belief? Please also share any research and evidence that there will be interference. If sharing is not possible, how might NHTSA evaluate opportunity cost associated with those forgone alternative uses of the spectrum? Because the sharing decision will not be made by NHTSA, need the agency evaluate that opportunity cost as part of its rulemaking?
19. How could spectrum sharing affect business interests and possible business approaches in relation to the deployment of the V2V technology? That is, if the FCC concludes that

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

some spectrum sharing will not result in interference, will that decision discourage some investment in V2V and V2I technology implementation and delay the realization of certain benefits? If so, what kinds of business development would be deterred or delayed?

20. Can message congestion be managed, or might some kind of active mitigation be needed in a V2V system? Any information that commenters can provide about past or current research on this issue, including research content and methodology, would be helpful to the agency. If commenters have conducted such research, how close are you to a production-ready implementation that ensures effective V2V operation in high-congestion environment? What statistics and measurements have you collected that illustrate effective, production-ready congestion mitigation strategies?
21. The agency requests comment on whether DSRC systems should be expected to last the life of the vehicle, and if not, how one might ensure that DSRC systems in individual vehicles remain operable after the consumer has purchased the vehicle.
22. Although NHTSA does not have the authority to require drivers to retrofit existing passenger vehicles with V2V devices, do commenters believe that the agency's decision to propose mandating V2V devices for new vehicles will spur development and application of aftermarket V2V devices? Can commenters provide research or evidence to support this view?
23. Are aftermarket V2V devices more likely to be simple Vehicle Awareness Devices (VADs), or are they more likely to be integrated into vehicles as retrofits, more similar to

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

OEM devices? What can the agency do, consistent with its authority, to help ensure that aftermarket devices can be and are installed properly?

24. Do commenters believe that the agency's technical observations for DSRC devices and safety applications would also apply for vehicles over 10,000 pounds GVWR? If not, why not?

25. How should NHTSA work to harmonize its actions on V2V with those being taken globally?

**d. Safety applications that V2V could facilitate**

Potential V2V Safety Applications are discussed in Section VI of the research report.

26. Do commenters believe that the agency's preliminary findings and conclusions for each of the safety applications discussed in the report are accurate? Why or why not? Please provide any available evidence or research to support your view.

27. The agency would appreciate if commenters, specifically entities currently developing production-intent V2V applications, could provide information regarding V2V applications they anticipate implementing once V2V technology becomes available in the fleet. More specifically, what applications and what safety warning and/or convenience functionality would be available to consumers of their products upon V2V entry to the marketplace?

**e. Public acceptance**

Section VII of the research report discusses public acceptance.

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

28. Do commenters believe that the agency's preliminary assessment of the public acceptance issues associated with V2V is accurate? Why or why not? Please provide any available evidence or research to support your view.
29. Do commenters foresee any issues regarding public or industry acceptance not discussed in the report that the agency should consider in developing its proposal? How do commenters recommend the agency address those issues, if any?
30. What suggestions do commenters have regarding how the agency should go about educating the public about security and privacy aspects of the V2V technology?

**f. Privacy considerations**

31. As noted in Section VIII of the research report, concurrent with its issuance of a regulatory proposal that would require V2V devices in new vehicles in a future year, the agency intends to publish a draft Privacy Impact Assessment (PIA) analyzing the potential privacy implications of its regulatory proposal. Although NHTSA welcomes privacy-related comments in response to the research report and ANPRM now being issued, the agency expects that its draft PIA will provide the public with a more detailed basis on which to evaluate potential privacy risks and proposed mitigation controls associated with V2V technology, and will seek public comment on its PIA at that time.

**g. V2V communications security**

NHTSA and DOT intend to conduct a thorough review of the security of the contemplated V2V system to ensure that all credible threats are identified and a solid course for addressing those threats has been developed. We will draw on the knowledge of security experts inside and outside of government in devising that review. We invite knowledgeable commenters

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

to address the questions below to help ensure we are drawing on the full range of expertise in dealing with these issues.

32. The current design for the security system for V2V communications, as discussed in Section IX of the report, is based on Public-Key Infrastructure (PKI), which is currently used to secure the passing of data on public networks (such as the internet). V2V envisions a machine-to-machine PKI system. Do commenters believe that using machine-to-machine PKI for V2V is feasible, and that a security system based on PKI provides the level of security needed to support wide-scale V2V deployment? If not, what other security approach would be a better alternative, and why?
33. Do commenters believe that the current security system design (as shown in Figure IX-3 of the research report) is a reasonable and sufficient approach for implementing a secure and trusted operating environment? If so, why? If not, why not, and what improvements are suggested?
34. The current security system design includes regular distribution of the Certificate Revocation List (CRL) to identify devices that are not functioning properly, as discussed in Section IX. Do commenters believe the CRL is necessary? If so, why? Is there an alternative approach to using CRLs to take V2V devices “off-line?” If so, please describe. If commenters believe that CRLs are necessary, are there alternative methods to CRL distribution beyond what the agency described in the research report? If so, what are they?
35. Do commenters believe a V2V system would create new potential “threat vectors” (i.e., “ways into” a vehicle’s electronic control unit) that could somehow control a vehicle or

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

manipulate its responses beyond those existing in today's vehicles? If so, please describe the extent to which they might arise in the context of the security approach described in Section IX of the research report.

36. Do commenters believe that V2V could introduce the threat of remote code execution, i.e., that, among possible threat vectors, malicious code could be introduced remotely into a vehicle through the DSRC device and could create a threat to affected vehicles? If so, do commenters have or plan to develop information (research or data) on this potential risk in the context of V2V, especially the current PKI-based approach to V2V security, as discussed in Section IX in the report?
37. Do commenters have suggestions on how NHTSA could mitigate these potential threats with standardized security practices and how NHTSA could implement a self-certification or third-party audit or testing program to guard against such threats? What research is needed to accomplish these tasks?
38. The currently contemplated security architecture does not involve encryption of the basic safety message (BSM), as explained in the report. In light of the fact that the system does involve asymmetric encryption of the security certificates that are a prerequisite to acceptance of a vehicle's BSM, does the absence of encryption of the BSM itself create any security threat, e.g., reverse engineering of a V2V system? If so, how might that threat be assessed and addressed?
39. If OEM DSRC devices were kept up-to-date through the current methods of upgrading that existing consumer electronics use today, would the use of this updating process



*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

introduce a new attack vector? What are the security ramifications of this vector and what are the possible mitigations of the threat?

40. Is there a possibility of cyber-attacks across the entire vehicle fleet and, if so, how should they be analyzed and addressed?

41. Are there any other specific security issues that have not been mentioned here, but that should be addressed in the V2V security review? If so, please identify them and discuss how they should be addressed.

#### **h. Liability**

42. Section X discusses issues concerning legal liability associated with a V2V program, especially concerns that have been raised by industry and NHTSA's assessment of those concerns. The agency requests comment on these issues. Do commenters believe that NHTSA's assessment of liability is accurate? Are there any other issues associated with liability that the agency should consider, and how do commenters recommend the agency address them?

#### **i. Preliminary cost estimates**

43. Section XI of the research report identifies preliminary cost estimates associated with V2V devices, with the communications network, and with the security systems. Do commenters believe that these costs are reasonably representative for the timeframes identified in the research report? If not, can commenters provide data to support alternative cost estimates?

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

44. Do commenters believe and have supporting information or references that indicate that per-unit costs for V2V devices could be different from the estimates used by the agency in the research report?
45. At this time, NHTSA does not intend to propose to require OEMs to include specific applications in new vehicles equipped with DSRC technology. Apart from equipment costs, what would the costs be to develop these applications? What would the unit cost be for an application in light of the fact that it would be used in every new vehicle produced by that OEM?

**j. Preliminary benefits estimates**

As described in the research report, NHTSA conducted laboratory simulator studies to test the potential effectiveness of certain safety applications of V2V technology with drivers. The simulations were derived from real-world crash data, including some event recorder data and previous detailed studies of driver behavior prior to crashes. NHTSA recognizes that this type of testing, which is based on conditions in a laboratory setting and does not fully mimic real world conditions, affects the agency's ability to make benefit estimates.

NHTSA also conducted real-world testing of those safety applications.<sup>3</sup> Data from this testing were used in validating the simulator studies. For example, the Model Deployment data were used to validate values for certain parameters (particularly driver response times and braking force applied in certain situations) and to discern relationships between parameters (e.g., how braking force varies with the driver's response time) to help ensure that the simulator reflected real-world driving performance. However, it may be feasible for NHTSA to conduct

---

<sup>3</sup> See Section VI of the research report for discussion of real world testing of V2V-enabled safety applications.

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

additional real-world testing of V2V technology to determine long-term driver behavior and the impact of a V2V mandate. The agency's laboratory conditions did not test whether driver use of V2V technology differs with routine distractions such as cell phones, talking to passengers, tuning radio, etc., and the agency may be able to explore these issues through additional testing. Existing studies of driver distraction and its effects on driver response to various types of safety warnings may be very helpful in this regard. In addition, NHTSA could also determine how drivers will react over time to warnings and the consequences for safety if warning systems fail or warn drivers unnecessarily. Human factors research underway concerning safety warning systems may be applicable to warnings regardless of whether their information source is V2V or vehicle-resident technologies. The laboratory conditions also involved relatively simple traffic scenario(s) and ideal weather conditions. NHTSA recognizes the limitations of applying results from its laboratory simulator testing. The application of the results for benefits estimates in this document provides an idea of what the benefits could be under specified conditions. In addition to further simulation data the agency expects to obtain, NHTSA will use available real-world testing data to estimate benefits for the NPRM.

Recognizing that our use of the simulation technique for developing the preliminary estimates found in the research report may need to be replaced or supplemented by additional data sources at the NPRM stage, we would appreciate commenters focusing on what additional methodologies may be helpful in estimating benefits.

46. How could our simulation be improved?

47. NHTSA is statutorily directed by Congress to issue standards to address safety need identified by the agency. In developing those standards, the agency is required to

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

consider “available” motor vehicle safety information. To a degree, the agency can increase the amount of information available to it. Indeed, the agency is directed to conduct “motor vehicle safety research, development, and testing programs and activities, including activities related to new and emerging technologies that impact or may impact motor vehicle safety.” However the type and amount of information that the agency can develop and the scientific means it can use to develop that information with respect to particular technologies varies as a function of factors such as resources, the type of technology involved and whether the technology is commonplace in the vehicle fleet, available only recently as an option in a limited number of high-end models or still in the research stage. In some circumstances, it may be possible to generate simulation data, but not real-world testing data. If commenters do not agree that it is possible to generate simulation data that can reasonably approximate potential real-world results, how would it be possible for NHTSA to fulfill its duty to carry out its safety mission? How could the agency develop sufficiently reliable data to support benefits estimates for technologies that do not yet exist in the on-road fleet? In those specific circumstances, what form could additional real-world testing take? To assist commenters in considering this issue, we refer them to the data already contained in the research report. In addition, NHTSA will continue to post any additional information about the Model Deployment in our public docket as it becomes available.

48. What ways, if any, do commenters suggest are possible for conducting real-world testing of V2V safety applications in the on-road fleet in the absence of a regulatory mandate for V2V technology?

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

49. What suggestions, if any, do commenters have to validate a simulation approach so as to verify or improve its real-world applicability?
50. In seeking to estimate the costs and benefits of a possible nationwide mandate for V2V how should NHTSA weigh results from its laboratory setting versus data that may come from the real-world test beds?
51. Should NHTSA consider the potential benefits of any additional V2V-enabled safety applications? If so, which applications? How should those be tested?
52. The agency has not estimated preliminary benefits associated with other potential implementations of V2V technology, including environmental or mobility benefits. Do commenters believe that there will be such additional benefits? If so, please provide evidence or research suggesting environmental, mobility, or other potential benefits of V2V.
53. The safety benefits of V2V are likely to be very different when there are few vehicles on the road using the technology from when most vehicles are using the technology. If NHTSA mandates V2V technology for new vehicles only, it will likely take about 15 to 20 years before the vast majority of all vehicles on the road have the technology installed. How might NHTSA take account of this in real world testing?
54. Once most, but not all, vehicles on the road have the V2V technology installed, it is possible that drivers may over-rely on the technology and may tend to not notice vehicles without the technology. Is this a realistic possibility? If so, is it unique to V2V or common to all technologies that rely on a driver's responsiveness to a warning? How can NHTSA examine this concern in a real-world test setting?

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

55. Safety technologies are rapidly evolving. How can we take account of new safety technologies, like collision avoidance technologies, when we are attempting to measure the potential incremental benefits of V2V? Which of these technologies are substitutes for V2V? Which are complements to V2V? Which of these technologies will be enhanced in their effectiveness by incorporating the additional safety data available through V2V technology (e.g., V2V will clearly identify other objects as vehicles and provide vital safety information not necessarily ascertainable only by sensors or cameras)? In addition, there are safety technologies that are still in the developmental stage. How could future testing (simulation or real-world) better assess the comparative effectiveness of V2V and other technologies?
56. Self-driving vehicles have the potential to dramatically reduce motor vehicle collisions. Even though these vehicles do not exist for sale to the public, how should we take account of this in evaluating the potential safety benefits of V2V? Is V2V an essential input into developing a viable self-driving car, an alternative technology that might compete with or discourage development of self-driving vehicles, or a complementary technology that can enable self-driving vehicles over time? Please explain why or why not.
57. It is NHTSA's view that, if V2V were not mandated by the government, it would fail to develop or would develop slowly. Because the value of V2V to one driver depends upon other drivers' adoption of the technology, V2V falls into the class of goods that

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

economists call “network goods.”<sup>4</sup> Economic analysis and experience with network goods indicates that in some markets network goods and the common standards to make these goods interact sometimes develop slowly, and in other cases may develop quickly when market forces are left to work on their own. Additionally, because the value of V2V to one driver depends upon other drivers’ adoption of the technology, it seems unlikely to NHTSA that a manufacturer would volunteer to “go first” with adding DSRC to its new vehicles, because those units would provide little benefit to their drivers until some critical mass of V2V-equipped vehicles is achieved, and that manufacturer could not know whether other manufacturers would soon follow suit. Moreover, an underlying security system to ensure the validity of basic safety messages exchanged between vehicles is an essential element of V2V. NHTSA believes it is not likely that an entity would step forward to provide such a system absent a predictable, industry-wide demand that only a government mandate is likely to provide. Is it your view that V2V would develop without NHTSA’s requirement of the technology? If so, how long would this take? How do you think this would come about? The implementation of the technology would to some degree depend not only on vehicles being equipped but also on their using compatible technical communication standards. Would adoption of the technology come from a single manufacturer or would a consortium of manufacturers come together and develop a single standard as they often do in computer markets?

---

<sup>4</sup> Nicholas Economides, “The Economics of Networks,” *International Journal of Industrial Organization*, vol. 14, no. 2, March 1996, pp. 673-699, available at <http://www.stern.nyu.edu/networks/94-24.pdf> (last accessed Jul. 21, 2014). The classic example of a network good is the telephone system—telephones have no value to consumers unless there are other consumers using the network and the value to consumers increases as others join the network.

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

In considering these questions, commenters should also consider the agency's need to be able to gather data and make judgments in a way that preserves its ability to carry out effectively the lifesaving mandate of the Vehicle Safety Act, 49 U.S.C. 30101 et seq.

### **III. Public Participation**

#### **a. How can I influence NHTSA's thinking on this subject?**

NHTSA welcomes public review of this ANPRM and the accompanying research report. NHTSA will consider the comments and information received in developing its eventual proposal for how to proceed on mandating and regulating V2V technology.

#### **b. How do I prepare and submit comments?**

Your comments must be written and in English. To ensure that your comments are filed correctly in the Docket, please include the docket number of this document (NHTSA-2014-0022) in your comments.

Your primary comments should not be more than 15 pages long.<sup>5</sup> However, you may attach additional documents to your primary comments. There is no limit on the length of the attachments. Please submit one copy of your comments, including the attachments, to the docket via one of the methods identified under **ADDRESSES** above. Submitting multiple copies of the same comment will clog the docket and impair the agency's ability to review information received.

Please note that pursuant to the Data Quality Act, in order for substantive data to be relied upon and used by the agency, it must meet the information quality standards set forth in the OMB and DOT Data Quality Act guidelines. Accordingly, we encourage you to consult the

---

<sup>5</sup> 49 CFR § 553.21.



*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

guidelines in preparing your comments. OMB's guidelines may be accessed at [http://www.whitehouse.gov/omb/fedreg\\_reproducible](http://www.whitehouse.gov/omb/fedreg_reproducible); DOT's guidelines may be accessed at [http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/subject\\_areas/statistical\\_policy\\_and\\_research/data\\_quality\\_guidelines/html/guidelines.html](http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/subject_areas/statistical_policy_and_research/data_quality_guidelines/html/guidelines.html).

Privacy Act: Anyone is able to search the electronic form of all comments received into any of our dockets by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an association, business, labor union, etc.). You may review DOT's complete Privacy Act statement published in the FEDERAL REGISTER on April 11, 2000 (65 Fed. Reg. 19477-78) or you may visit <http://www.dot.gov/privacy.html>.

**c. How can I be sure that my comments were received?**

If you submit comments by hard copy and wish Docket Management to notify you upon its receipt of your comments, enclose a self-addressed, stamped postcard in the envelope containing your comments. Upon receiving your comments, Docket Management will return the postcard by mail. If you submit comments electronically, your comments should appear automatically in Docket No. NHTSA-2014-0022 on <http://www.regulations.gov>. If they do not appear within two weeks of posting, we suggest that you call the Docket Management Facility at 1-800-647-5527.

**d. How do I submit confidential business information?**

If you wish to submit any information under a claim of confidentiality, you should submit three copies of your complete submission, including the information that you claim to be confidential business information, to the Chief Counsel, NHTSA, U.S. Department of Transportation, 1200 New Jersey Avenue, SE, Washington, DC 20590. In addition, you should

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

submit a copy from which you have deleted the claimed confidential business information to Docket Management, either in hard copy at the address given above under **ADDRESSES**, or electronically through regulations.gov. When you send a comment containing information claimed to be confidential business information, you should include a cover letter setting forth the information specified in 49 CFR Part 512.

**e. Will the agency consider late comments?**

We will consider all comments received to the docket before the close of business on the comment closing date indicated above under **DATES**. As new information becomes available after the comment closing date, or if commenters wish to respond to other comments, we encourage interested persons to supplement their original comments. We will consider these additional comments to the extent possible, but we caution that we may not be able to fully address those comments prior to the agency's proposal.

**f. How can I read the comments submitted by other people?**

You may read the comments received by Docket Management in hard copy at the address given above under **ADDRESSES**. The hours of the Docket Management office are indicated above in the same location.

You may also read the comments on the Internet by doing the following:

- (1) Go to <http://www.regulations.gov>.
- (2) Regulations.gov provides two basic methods of searching to retrieve dockets and docket materials that are available in the system:
  - a. the search box on the home page which conducts a simple full-text search of the website, into which you can type "NHTSA-2014-0022," and

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

- b. “Advanced Search,” which is linked on the regulations.gov home page, and which displays various indexed fields such as the docket name, docket identification number, phase of the action, initiating office, date of issuance, document title, document identification number, type of document, FEDERAL REGISTER reference, CFR citation, etc. Each data field in the advanced search function may be searched independently or in combination with other fields, as desired. Each search yields a simultaneous display of all available information found in regulations.gov that is relevant to the requested subject or topic.
- (3) Once you locate Docket No. NHTSA-2014-0022 at <http://www.regulations.gov>, you can download the comments you wish to read. We note that since comments are often imaged documents rather than word processing documents (e.g., PDF rather than Microsoft Word), some comments may not be word-searchable.

Please note that, even after the comment closing date, we will continue to file relevant information in the Docket as it becomes available. Further, some people may submit late comments. Accordingly, we recommend that you periodically check the Docket for new material.

#### **IV. Rulemaking Notices and Analyses**

##### **a. Executive Orders 12,866 and 13,563 and DOT Regulatory Policies and Procedures**

Executive Order 12,866, “Regulatory Planning and Review” (58 FR 51735, October 4, 1993), provides for making determinations whether a regulatory action is “significant” and

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

therefore subject to OMB review and to the requirements of the Executive Order. The Order defines a “significant regulatory action” as one that is likely to result in a rule that may:

- (1) Have an annual effect on the economy of \$100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or Tribal governments or communities;
- (2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
- (3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
- (4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

We have considered the potential impact of this ANPRM under Executive Order 12866 and the Department of Transportation's regulatory policies and procedures. As discussed above, there are a number of considerations that remain to be explored with respect to V2V technology and the agency lacks the necessary information to develop a proposal at this time. Based on the information we do have, we developed this notice and the accompanying research report, which contains very preliminary discussions of costs and benefits, in order to facilitate public input. Preliminary estimates indicate a future proposed rule would be economically significant under Executive Order 12866. This rulemaking action has also been determined to be “significant” under the Department of Transportation's Regulatory Policies and Procedures (44 FR 11034; February 26, 1979) and has been reviewed by the Office of Management and Budget.

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

**b. Regulatory Flexibility Act**

Pursuant to the Regulatory Flexibility Act, 5 U.S.C. 601 et seq., no analysis is required for an ANPRM. However, vehicle manufacturers and equipment manufacturers are encouraged to comment if they identify any aspects of the potential rulemaking that may apply to them.

**c. Executive Order 13132 (Federalism)**

NHTSA has examined today's ANPRM pursuant to Executive Order 13132 (64 FR 43255, August 10, 1999) and concluded that no additional consultation with States, local governments or their representatives is mandated beyond the rulemaking process at this time. The agency has concluded that the document at issue does not have federalism implications because it does not have "substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government."

NHTSA's safety standards can have preemptive effect in at least two ways. First, the National Traffic and Motor Vehicle Safety Act contains an express preemption provision: "When a motor vehicle safety standard is in effect under this chapter, a State or a political subdivision of a State may prescribe or continue in effect a standard applicable to the same aspect of performance of a motor vehicle or motor vehicle equipment only if the standard is identical to the standard prescribed under this chapter." 49 U.S.C. 30103(b)(1). It is this statutory command that would unavoidably preempt State legislative and administrative law, not today's ANPRM, so consultation would be unnecessary.

We are aware that, depending on the nature of the proposal ultimately adopted, federalism implications could arise. Currently, there is no Federal requirement regarding V2V

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

communications. As a result, any State laws or regulations that seek to regulate V2V communications would not currently be preempted by Federal law. However, if NHTSA issues a standard on the same aspect of V2V communication performance, those State laws and regulations would be preempted if they differed from the Federal requirements. Thus, the possibility of statutory preemption of State laws and regulations does exist. At this time, we do not know of any State laws or regulations that currently exist that are potentially at risk of being preempted, but in this document do request comment on any existing or planned laws or regulations that would fall into this category.

Second, the Supreme Court has recognized the possibility of implied preemption: State requirements imposed on motor vehicle manufacturers, including sanctions imposed by State tort law, can stand as an obstacle to the accomplishment and execution of a NHTSA safety standard. When such a conflict is discerned, the Supremacy Clause of the Constitution makes the State requirements unenforceable. See *Geier v. American Honda Motor Co.*, 529 U.S. 861 (2000). NHTSA has considered today's ANPRM and does not currently foresee any potential State requirements that might conflict with it. Without any conflict, there could not be any implied preemption.

**d. Executive Order 12988 (Civil Justice Reform)**

With respect to the review of the promulgation of a new regulation, section 3(b) of Executive Order 12988, "Civil Justice Reform" (61 FR 4729, February 7, 1996) requires that Executive agencies make every reasonable effort to ensure that the regulation: (1) Clearly specifies the preemptive effect; (2) clearly specifies the effect on existing Federal law or regulation; (3) provides a clear legal standard for affected conduct, while promoting

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

simplification and burden reduction; (4) clearly specifies the retroactive effect, if any; (5) adequately defines key terms; and (6) addresses other important issues affecting clarity and general draftsmanship under any guidelines issued by the Attorney General. This document is consistent with that requirement.

**e. Paperwork Reduction Act**

Under the Paperwork Reduction Act of 1995 (PRA), a person is not required to respond to a collection of information by a Federal agency unless the collection displays a valid OMB control number. There is no information collection requirement associated with this ANPRM.

**f. National Technology Transfer and Advancement Act**

Section 12(d) of the National Technology Transfer and Advancement Act of 1995 (NTTAA), Public Law 104-113, (15 U.S.C. 272) directs the agency to evaluate and use voluntary consensus standards in its regulatory activities unless doing so would be inconsistent with applicable law or is otherwise impractical. Voluntary consensus standards are technical standards (e.g., materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies, such as the Society of Automotive Engineers. The NTTAA directs us to provide Congress (through OMB) with explanations when we decide not to use available and applicable voluntary consensus standards. While NHTSA is considering the relevance of a number of voluntary consensus standards to potential V2V-related FMVSSs, as discussed in Section V of the research report, it has not yet developed specific regulatory requirements, and thus the NTTAA does not apply for purposes of this ANPRM.

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

#### **g. Unfunded Mandates Reform Act**

The Unfunded Mandates Reform Act of 1995 requires agencies to prepare a written assessment of the costs, benefits, and other effects of proposed or final rules that include a Federal mandate likely to result in the expenditure by State, local or tribal governments, in the aggregate, or by the private sector, of more than \$100 million annually (adjusted for inflation with base year of 1995). This ANPRM would not result in expenditures by State, local or tribal governments, in the aggregate, in excess of \$100 million annually. However, given the cost estimates of requiring V2V technology, as discussed in Section XI of the research report, it is very possible that the total cost of a proposed rule on the private sector could exceed \$100 million. Given that, the agency has prepared a preliminary assessment of some of the possible costs of V2V technology, contained in Section XI of the research report, and we refer readers there for more information.

#### **h. National Environmental Policy Act**

NHTSA has analyzed this rulemaking action for the purposes of the National Environmental Policy Act. The agency has preliminarily determined that installation of V2V technology alone would not have any significant impact on the quality of the human environment. Any environmental effects that could accrue as a result of mandating V2V technology for new light vehicles would depend upon applications voluntarily undertaken in the marketplace by vehicle manufacturers. While the agency believes that any such applications would result in positive environmental impacts, these impacts are too remote and speculative at this time to quantify or analyze. *See, e.g., City of Dallas, Tex. v. Hall*, 562 F.3d 712, 719-20 (5th Cir. 2009); *Louisiana Crawfish Producers Ass'n-West v. Rowan*, 463 F.3d 352, 358 (5th Cir.



*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

2006); *Sierra Club v. Marsh*, 976 F.2d 763, 767 (1st Cir. 1992). Applying the “rule of reason,” NHTSA has determined that the usefulness to the decision-making process of such a speculative environmental analysis is minimal, especially in light of the lack of a significantly close relationship between mandating V2V technology and such applications. *See Dept. of Transp. v. Public Citizen*, 541 U.S. 752, 767-8 (2004); *City of Dallas*, 562 F.3d at 719-20. NHTSA seeks comment on whether and how to consider potential indirect environmental benefits of V2V technology as it moves forward.

**i. Executive Order 13211**

Executive Order 13211 (66 FR 28355, May 18, 2001) applies to any rulemaking that: (1) Is determined to be economically significant as defined under E.O. 12866, and is likely to have a significantly adverse effect on the supply of, distribution of, or use of energy; or (2) that is designated by the Administrator of the Office of Information and Regulatory Affairs as a significant energy action. This rulemaking is not subject to E.O. 13211.

**j. Plain Language**

The Plain Writing Act of 2010 (Pub. L. 111-274) requires Federal agencies to write documents in a clear, concise, and well-organized manner. NHTSA has written this ANPRM to be consistent with the Plain Writing Act as well as the Presidential Memorandum, “Plain Language in Government Writing,” published June 10, 1998 (63 FR 31883). NHTSA requests comment on this ANPRM with respect to the clarity and effectiveness of the language used.

**k. Regulatory Identifier Number (RIN)**

The Department of Transportation assigns a regulation identifier number (RIN) to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory

*This document is a prepublication version of that signed by the NHTSA Senior Associate Administrator. We have taken steps to ensure the accuracy of this version, but it is not the official version*

Information Service Center publishes the Unified Agenda in April and October of each year.

You may use the RIN contained in the heading at the beginning of this document to find this action in the Unified Agenda.

### **I. Privacy Act**

Anyone is able to search the electronic form of all comments received into any of our dockets by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an association, business, labor union, etc.). You may review DOT's complete Privacy Act Statement in the Federal Register published on April 11, 2000 (65 FR 19477-78) or you may visit <http://www.dot.gov/individuals/privacy/privacy-policy> (last accessed June 20, 2014).

**Authority:** 49 U.S.C. 30111, 30181-83; delegation of authority at 49 CFR 1.95 and 501.8.

Issued in Washington, DC on \_\_\_\_\_ under authority delegated in 49 CFR part 1.95.

---

Daniel C. Smith  
Senior Associate Administrator for Vehicle Safety

Billing Code 4910-59-P