DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

[Docket No. NHTSA-2015-0006]

New Car Assessment Program

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

ACTION: Request for comments

SUMMARY: This document requests public comment on the National Highway Traffic Safety Administration's (NHTSA) plan to update its New Car Assessment Program (NCAP). If this plan is implemented, NHTSA would recommend to consumers various vehicle models that are equipped with automatic emergency braking (AEB) systems, which can enhance the driver's ability to avoid or mitigate rear-end crashes. For many years, NCAP has provided comparative information on the safety of new vehicles to assist consumers with vehicle purchasing decisions. NCAP was upgraded beginning with model year 2011 vehicles to include recommended crash avoidance technologies in its program. Including this information in NCAP allows consumers to compare not only the level of crash protection afforded by certain vehicles they are considering to purchase, but also the types of advanced crash avoidance technologies that are recommended by the agency to help them avoid crashes.

DATES: You should submit your comments early enough to ensure that Docket Management receives them no later than **[INSERT DATE THAT IS 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

ADDRESSES: Comments should refer to the docket number above and be submitted by one of the following methods:

- *Federal Rulemaking Portal:* *http://www.regulations.gov*. Follow the online instructions for submitting comments.
- *Mail:* Docket Management Facility, U.S. Department of Transportation, 1200 New Jersey Avenue S.E., West Building Ground Floor, Room W12-140, Washington, DC 20590-0001.
- *Hand Delivery:* 1200 New Jersey Avenue S.E., West Building Ground Floor, Room W12-140, Washington, DC, between 9 a.m. and 5 p.m. ET, Monday through Friday, except Federal Holidays.
- *Instructions:* For detailed instructions on submitting comments, see the Public Participation heading of the **SUPPLEMENTARY INFORMATION** section of this document. Note that all comments received will be posted without change to *http://www.regulations.gov*, including any personal information provided.
- *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). For access to the docket to read background documents or comments received, go to *http://www.regulations.gov* or the street address listed above. Follow the online instructions for accessing the dockets.

FOR FURTHER INFORMATION: For technical issues: Dr. Abigail Morgan, Office of Crash Avoidance Standards, Telephone: 202-366-1810, Facsimile: 202-366-5930, NVS-122.

For NCAP issues: Mr. Clarke Harper, Office of Crash Avoidance Standards, Telephone: 202-366-1810, Facsimile: 202-366-5930, NVS-120.

For legal issues: Mr. David Jasinski and Ms. Analiese Marchesseault, Office of the Chief Counsel, Telephone: 202–366–2992, Facsimile: 202–366–3820, NCC-112.

The mailing address for these officials is as follows: National Highway Traffic Safety Administration, 1200 New Jersey Avenue, S.E., Washington, DC 20590.

SUPPLEMENTARY INFORMATION: The National Highway Traffic Safety Administration's (NHTSA) New Car Assessment Program (NCAP) provides comparative safety rating information on new vehicles to assist consumers with their vehicle purchasing decisions. NCAP was upgraded beginning with model year 2011 vehicles to include, among other changes, recommended advanced crash avoidance technologies when these technologies meet NCAP's performance criteria. Technologies that were part of the 2011 upgrade were electronic stability control (ESC), forward collision warning (FCW), and lane departure warning (LDW). Subsequently, in 2014, NHTSA replaced ESC, which is now mandatory for all new light vehicles, with another technology, rearview video systems (RVS).[1]

FCW detects vehicles ahead and cautions a driver of an impending collision, so the driver can brake or steer to avoid or mitigate the collision. LDW monitors lane markings on the road and cautions a driver of unintentional lane drift. RVS assists the driver in seeing whether there

[1] On April 7, 2014, NHTSA published a final rule (79 FR 19177) requiring rearview video systems. The rule provides a phase-in period that begins on May 1, 2016 and ends on May 1, 2018 when all new light vehicles will be required to be equipped with RVS. As was done with electronic stability control, RVS will no longer be an NCAP recommended technology once RVS is required on all new light vehicles.

are any obstructions, particularly a person or people, in the area immediately behind the vehicle. The RVS is generally installed in the rear of the vehicle and connected to a video screen.

This document requests comments on the agency's plan to further upgrade NCAP to include recommendations to consumers of vehicle models that are equipped with automatic emergency braking (AEB) systems, specifically crash imminent braking (CIB) and dynamic brake support (DBS), which can use information from an FCW system’s sensors to enhance the driver's ability to avoid or mitigate rear-end crashes. CIB systems provide automatic braking when forward-looking sensors indicate that a crash is imminent and the driver is not braking. DBS systems provide supplemental braking when sensors determine that driver-applied braking is insufficient to avoid an imminent crash.

This plan would add CIB and DBS to the three crash avoidance technologies that the agency currently recommends on the agency’s web site, *www.safercar.gov*. By including CIB and DBS systems into NCAP, consumers would receive important information regarding the safety risks associated with rear-end crashes and the vehicle models that offer effective countermeasures, which can assist the driver in avoiding or mitigating these crashes. In addition, the agency believes that if it recognizes AEB systems that meet NCAP’s performance measures, and thereby encourages consumers to purchase vehicles that are equipped with these systems, manufacturers would have an incentive to offer these systems on additional vehicles they produce.

Crash Imminent Braking and Dynamic Brake Support as Recommended Advanced Technology Features

In addition to issuing star ratings based on the crashworthiness and rollover resistance of vehicle models, the agency also provides additional information to consumers by recommending certain advanced crash avoidance technologies on the agency's web site, *www.safercar.gov*. For each vehicle make/model, the web site currently shows (in addition to a list of some of the vehicle's safety features) the model's 5-star crashworthiness and rollover resistance ratings and whether the vehicle model is equipped with any of the three advanced crash avoidance safety technologies that the agency currently recommends to consumers. NHTSA began recommending advanced crash avoidance technologies to consumers starting with the model year 2011.[2] The agency recommends vehicle technologies to consumers as part of NCAP if the technology: (1) addresses a major crash problem, (2) is supported by information that supports its potential or actual safety benefit, and (3) is able to be tested by repeatable performance tests and procedures to ensure a certain level of performance.

For more than three years, NHTSA has been carefully reviewing and evaluating CIB and DBS systems. The agency has also conducted test track research to better understand the performance capabilities of these systems. This work is documented in two reports, "Forward-Looking Advanced Braking Technologies Research Report" (June 2012)[3] and "Automatic Emergency Braking System Research Report" (August 2014).[4]

CIB and DBS systems are two crash avoidance systems designed to mitigate or avoid rear-end crashes. The agency's research found that CIB and DBS systems are commercially available on a number of different production vehicles and these systems can be tested successfully to defined performance measures. NHTSA has developed performance measures to

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[2] See 73 FR 40016.
[3] See http://www.Regulations.gov, NHTSA 2012-0057-0001.
[4] See http://www.Regulations.gov, NHTSA 2012-0057-0037.

ensure that CIB and DBS systems address the rear-end crash safety problem in real-world situations by providing automatic or supplemental vehicle braking that will help drivers mitigate or avoid rear-end crashes. The agency found that systems meeting these performance measures have the potential to help reduce the number of rear-end crashes as well as deaths and injuries that result from these crashes. Therefore, the agency believes that it is appropriate to include CIB and DBS systems in NCAP as recommended crash avoidance technologies on *www.safercar.gov*.

In addition to the agency's research on CIB and DBS systems, these AEB technologies were among the topics included in an April 5, 2013, Request for comments notice on a variety of potential areas for improvement of NCAP.[5] Most commenters supported including CIB and DBS in NCAP. Some commenters stated generally that available research supports the agency's conclusion that these technologies are effective at reducing rear-end crashes with some of those commenters citing specific research they had conducted that they deemed relevant.[6]

Rear-end crashes constitute a significant vehicle safety problem. In a detailed analysis of 2006-2008 crash data,[7] NHTSA determined that approximately 1,700,000 rear-end crashes involving passenger vehicles occur each year.[8] These crashes result in approximately 1,000 deaths and 700,000 injuries annually. The size of the safety problem has remained consistent

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[5] See 78 FR 20597.

[6] See http://www.Regulations.gov, NHTSA 2012-0180. For discussions of specific research see comments of Robert Bosch LLC, NHTSA-2012-0180-0028, and the Insurance Institute for Highway Safety (IIHS), NHTSA-2012-0180-0026.

[7] These estimates were derived from NHTSA's 2006-2008 Fatality Analysis Reporting System (FARS) data and non-fatal cases in NHTSA's 2006-2008 National Automotive Sampling System General Estimates System (NASS/GES) data.

[8] The 1,700,000 total cited in the two NHTSA reports reflects only crashes in which the front of a passenger vehicle impacts the rear of another vehicle.

since then. In 2012, the most recent year for which data are available, there were a total of 1,663,000 rear-end crashes. These rear-end crashes in 2012 resulted in 1,172 deaths and 706,000 injuries, which represents 3 percent of all fatalities and 30 percent of all injuries from motor vehicle crashes in 2012.[9,10]

As part of its rear-end crash analysis, the agency concluded that AEB systems would have had a favorable impact on a little more than one-half of rear-end crashes.[11] The remaining crashes, which involved circumstances such as high speed crashes resulting in a fatality in the lead vehicle or one vehicle suddenly cutting in front of another vehicle, were not crashes that current AEB systems would be able to prevent or mitigate. The agency has estimated CIB and DBS system effectiveness based on its research findings from track testing of these systems.

In July 2012, the agency issued a Request for comments notice seeking feedback on its CIB and DBS research.[12] Ford Motor Company indicated that the Lead Vehicle Stopped (LVS) scenario actually consists of two scenarios, one in which the lead vehicle is actually stopped or stationary, and one in which the lead vehicle is decelerating and comes to a stop before the crash occurs but could have been previously seen moving by the AEB system sensors. Additional analysis of LVS crashes found that these crashes are evenly split between lead vehicle stopped

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[9] See NHTSA’s Traffic Safety Facts 2012, Page 70.
[10] The approximately 1,000 deaths per year in 2006-2008 were limited to two-vehicle crashes, as fatal crash data at the time did not contain detailed information on crashes involving three or more vehicles. This information was added starting with the 2010 data year, and the 1,172 deaths in 2012 occurred in crashes involving any number of vehicles.
[11] See “Forward-Looking Advanced Braking Technologies Research Report” (June 2012). (http://www.Regulations.gov, NHTSA 2012-0057-0001), page 12.
[12] See 77 FR 39561.

and lead vehicle decelerating to a stop (LVD-S) crashes, each representing about 32 percent of the rear-end crash population.

The agency is issuing this document to request comments on its plan to update NCAP. The agency believes that, through NCAP, it can help not only to educate consumers on the role AEB technologies play in addressing rear-end crashes, but also to utilize market incentives to encourage wider incorporation of these important safety technologies.

The advanced crash avoidance technologies that are currently recommended by NHTSA through NCAP (as "Recommended Advanced Technology Features") are shown on *www.safercar.gov*. Our plan is to add CIB and DBS systems as recommended advanced technology features on our website.

Planned Criteria for Recognizing a Vehicle Make/Model as Having a Recommended CIB or DBS System

For the agency to determine which CIB and DBS systems it will recommend to consumers, NHTSA needs a means for evaluating CIB and DBS systems. The agency has developed test procedures for both CIB and DBS systems as part of its research effort.[13] Although these procedures have been designed to provide a reasonable assessment of overall system performance, the agency may modify the number of test scenarios and the number of test trials per test scenario to accommodate the practical needs of NCAP. The following sections provide a brief summary of the CIB and DBS planned test procedures. The information

[13] Copies of the test procedures that were used by NHTSA to conduct light vehicle AEB system evaluations in 2014 may be found at http://www.Regulations.gov, NHTSA-2012-0057-0038.

presented here is intended to indicate the level of vehicle performance the test procedures would set in order for CIB and DBS systems to receive NCAP recommendation.

The planned test procedures represent the four primary scenarios present in the rear-end crash target population. They also include a fifth scenario to assess whether an AEB system activates in a specific non-crash-imminent scenario (subsequently referred to as a "false positive" scenario). The five test scenarios are:

1. Lead vehicle stopped (LVS)
2. Lead vehicle moving (LVM) at a constant speed slower than the SV
3. Lead vehicle decelerating (LVD)
4. Lead vehicle decelerating to a stop (LVD-S)
5. False positive test (steel trench plate, STP)

Tables 1 and 2 present the test speeds and performance measures developed for each of NHTSA's AEB test scenarios for CIB and DBS. As shown in the second column of these tables, the test speeds for the vehicle being tested (hereinafter, the subject vehicle (SV)) and for the lead vehicle (hereinafter, principal other vehicle (POV)) are the same for the respective CIB and DBS scenarios. However, in most cases, the DBS performance measures specify a greater SV speed reduction than the corresponding CIB test (the exception being the LVM test performed with a SV speed of 25 mph). This is because the speed reductions present during DBS evaluations are the result of the foundation brake application plus the supplementary effect of DBS, and the foundation brake applications used during DBS evaluations are typically commanded earlier than the automatic brake applications during CIB tests.

TABLE 1. CIB Test Scenarios and System Performance Test Measures

Scenarios	***Speeds of Vehicles***	***Satisfactory Performance***
LVS	SV 25 mph (40.2 km/h) POV 0 mph (0 km/h)	Speed reduction of ≥ 9.8 mph (15.8 km/h) for at least 7 of 8 valid test trials

LVM	SV 25 mph (40.2 km/h) POV 10 mph (16.1 km/h)	No SV-to-POV impact for at least 7 of 8 valid test trials
LVM	SV 45 mph (72.4 km/h) POV 20 mph (32.2 km/h)	Speed reduction of ≥ 9.8 mph (15.8 km/h) for at least 7 of 8 valid test trials
LVD	SV 35 mph (56.3 km/h) POV 35 mph (56.3 km/h)	Speed reduction of ≥ 10.5 mph (16.9 km/h) for at least 7 of 8 valid test trials
LVD-S	SV 25 mph (40.2 km/h) POV 25 mph (40.2 km/h)	Speed reduction of ≥ 9.8 mph (15.8 km/h) for at least 7 of 8 valid test trials
False positive	25 mph (40.2 km/h)	Peak SV deceleration ≤ 0.25g
False positive	45 mph (72.4 km/h)	Peak SV deceleration ≤ 0.25g

TABLE 2. DBS Test Scenarios and System Performance Measures

Scenarios	***Speeds of Vehicles***	***Satisfactory Performance***
LVS	SV 25 mph (40.2 km/h) POV 0 mph (0 km/h)	No SV-to-POV impact for at least 7 of 8 valid test trials
LVM	SV 25 mph (40.2 km/h) POV 10 mph (16.1 km/h)	No SV-to-POV impact for at least 7 of 8 valid test trials
LVM	SV 45 mph (72.4 km/h) POV 20 mph (32.2 km/h)	No SV-to-POV impact for at least 7 of 8 valid test trials
LVD	SV 35 mph (56.3 km/h) POV 35 mph (56.3 km/h)	No SV-to-POV impact for at least 7 of 8 valid test trials
LVD-S	SV 25 mph (40.2 km/h) POV 25 mph (40.2 km/h)	No SV-to-POV impact for at least 7 of 8 valid test trials
False positive	25 mph (40.2 km/h)	Peak SV deceleration ≤ 125% of the average peak SV deceleration realized during a series of baseline brake stops
False positive	45 mph (72.4 km/h)	Peak SV deceleration ≤ 125% of the average peak SV deceleration realized during a series of baseline brake stops

As currently written, each test procedure involves a total of 56 test runs (eight valid test trials for each of the seven test scenarios). The test procedures also include time to condition the SV brakes, including a full FMVSS No. 135 brake burnish prior to testing and a brake warming regiment to ensure the initial brake temperature is within a range before each test trial.

Additionally, because the DBS evaluations specify that the SV brakes be applied, the DBS procedures include a series of eight brake characterization tests. The purpose of these brake characterization tests is to determine the position and force input magnitudes to be used by the brake controller robot during test conduct. This process determines the amount of braking to apply during DBS testing that is sufficiently high to activate the DBS system being tested, yet low enough that the SV's conventional brake assist system[14] is not activated. NHTSA plans to use a programmable brake controller to apply all brake applications defined in the DBS test procedure.

Also with respect to the DBS test procedure, the agency found that in some vehicles, the brake pedal moves toward the floor during DBS activation without the driver applying additional force to the pedal. In this situation, the force at the brake pedal will decrease if the brake controller maintains a constant pedal position (rather than following it as it moves to the floor). Even though the brake pedal position does not change, the DBS system may misinterpret this force reduction as the driver releasing the brakes, incorrectly assuming that strong supplemental DBS braking is no longer needed. To address this, NHTSA has supplemented the displacement (i.e., position) feedback-based brake applications in the DBS test procedure with an optional brake application technique featuring "hybrid feedback" control, which includes a combination of displacement and force control.

Hybrid feedback helped certain vehicles reach their DBS-enhanced braking potential by preventing the applied brake force from falling to zero. However, the limited data collected indicate use of hybrid-based braking will not benefit most vehicles. With a few exceptions, vehicles achieved better DBS performance with displacement feedback brake applications as opposed to hybrid feedback brake applications. The agency will work with manufacturers to

[14] Conventional brake assist system is a technology that initiates supplemental braking based on brake pedal application rate without the use of any forward-sensing information.

understand their preference of the optional hybrid feedback or displacement-based feedback during NHTSA's evaluation of their vehicles.

For the purpose of conducting AEB testing, the agency designed and manufactured a strikeable surrogate vehicle (SSV).[15] The physical appearance of the SSV resembles the rear section of a 2011 Ford Fiesta hatchback. The SSV is constructed primarily from carbon fiber, which enables the SSV to withstand repeated impacts with negligible change in its shape over time and without causing harm to test drivers or damage to vehicles being evaluated. If it is struck and damaged, the SSV can be reconstructed to its original specifications. Our testing shows that the SSV generates CIB and DBS system activation just as an actual vehicle would. The agency plans to use the SSV to evaluate the performance of vehicles.

Public Participation

On what topics is the agency requesting comments?

This document requests comments on the agency's plan to recommend CIB and DBS systems in the NCAP program. Based on comments received in response to the April 5, 2013, Request for comments notice on a variety of potential areas for improvement of NCAP (78 FR 20597), including CIB and DBS, the agency believes that motor vehicle manufacturers, suppliers, and consumer advocacy groups generally agree that consumers would benefit from being provided with information about CIB and DBS systems and their potential to help drivers

[15] For details of the NHTSA designed SSV, see http://www.Regulations.gov, NHTSA-2012-0057-0032, NHTSA's Stirkeable Surrogate Vehicle (SSV) Design Overview, and NHTSA-2012-0057-0034, Radar Measurements of NHTSA's Surrogate Vehicle (SSV).

avoid rear-end crashes. However, the agency will consider whether there are compelling arguments against including CIB and DBS system evaluations in NCAP.

The agency is also interested in any suggestions or observations regarding the practical aspects of incorporating CIB and DBS system evaluations into NCAP as recommended technologies. In particular, the agency would be interested in any comments or suggestions regarding the following:

- *Test procedures:* What is the general response to the planned test procedures? How will the combination of test scenarios and test speeds described provide an accurate representation of real-world CIB and DBS system performance, and how can they be improved? Can any of the scenarios be removed from the test procedures while still ensuring a certain level of system performance? If so, what are they and why? Similarly, why and how should the number of test trials per scenario be reduced? What, if any, specific improvements to the test procedures are still necessary?
- *The Strikeable Surrogate Vehicle (SSV):* Are there specific elements that would cause NHTSA's SSV to be inappropriate for use in the agency's CIB and DBS performance evaluations? If so, what are they, and how are they a problem? Will the SSV meet the needs for CIB and DBS evaluation for the foreseeable future? If not, why not? What alternatives could be considered and why?
- *DBS Test Brake Application Strategy:* We seek comment on whether the two brake application methods defined in the DBS test procedure, those based on displacement or hybrid control, provide NHTSA with enough flexibility to accurately assess the performance of all DBS systems. What specific refinements, if any, are needed to either application method?

- *CIB and DBS Research:* We seek comment on whether there is any recent research concerning CIB and DBS systems that is not reflected in the agency's research to date. If so, please provide a reference to that research.

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 in your comments.

Your comments must not be more than 15 pages long (49 CFR 553.21). NHTSA established this limit to encourage you to write your primary comments in a concise fashion. However, you may attach necessary additional documents to your comments. There is no limit on the length of the attachments.

Please submit one copy (two copies if submitting by mail or hand delivery) of your comments, including the attachments, to the docket following the instructions given above under ADDRESSES. Please note, if you are submitting comments electronically as a PDF (Adobe) file, we ask that the documents submitted be scanned using an Optical Character Recognition (OCR) process, thus allowing the agency to search and copy certain portions of your submissions.

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 you claim to be confidential business information, to the Office of the Chief Counsel, NHTSA, at the address given above under FOR FURTHER INFORMATION CONTACT. In addition, you may submit a copy (two copies if submitting by mail or hand delivery), from which you have deleted the claimed confidential business information, to the docket by one of the methods given above under

ADDRESSES. 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 NHTSA's confidential business information regulation (49 CFR Part 512).

Will the agency consider late comments?

NHTSA will consider all comments received before the close of business on the comment closing date indicated above under DATES. To the extent possible, the agency will also consider comments received after that date.

How can I read the comments submitted by other people?

You may read the comments received at the address given above under ADDRESSES. The hours of the docket are indicated above in the same location. You may also see the comments on the Internet, identified by the docket number at the heading of this notice, at *http://www.regulations.gov*.

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

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/privacy.html*.

Issued in Washington, DC, on: _____________ under authority delegated in 49 CFR 1.95 and 501.8.

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Daniel C. Smith
Senior Associate Administrator for Vehicle Safety

Billing Code: 4910-59-P

[Signature page for New Car Assessment Program; Request for comments, AEB]