

The Associate Administrator for Vehicle Safety Research, Nathaniel Beuse, signed the following proposed guidelines on November 21, 2016, and we are submitting them for publication in the Federal Register. While NHTSA has 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 ([www.gpo.gov/fdsys/search/home.action](http://www.gpo.gov/fdsys/search/home.action)) and on Regulations.gov (<https://www.regulations.gov/docket?D=NHTSA-2013-0137>). 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-2013-0137**

### **Visual-Manual NHTSA Driver Distraction Guidelines for Portable and Aftermarket Devices**

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

**ACTION:** Notice of proposed Federal guidelines.

**SUMMARY:** This notice details the proposed contents of the second phase of the National Highway Traffic Safety Administration's (NHTSA) Driver Distraction Guidelines (Phase 2 Guidelines). The purpose of the Phase 2 Guidelines is to provide a safety framework for developers of portable and aftermarket electronic devices to use when developing visual-manual user interfaces for their systems. The Guidelines encourage innovative solutions such as pairing and Driver Mode that, when implemented, will reduce the potential for unsafe driver distraction by limiting the time a driver's eyes are off the road, while at the same time preserving the full functionality of these devices when they are not used while driving. Currently no safety guidelines exist for portable device technologies when they are used during a driving task. NHTSA seeks comments and suggestions to improve this proposal.

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**DATES:** You should submit your comments early enough to be received not later than

**[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].**

**ADDRESSES:** You may submit comments to the docket number identified in the heading of this document by any of the following methods:

- Federal eRulemaking Portal: Go to <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, D.C. 20590-0001
- Hand Delivery or Courier: 1200 New Jersey Avenue S.E., West Building Ground Floor, Room W12-140, between 9 a.m. and 5 p.m. ET, Monday through Friday, except Federal holidays.
- Fax: 202-493-2251.

**Instructions:** All submissions must include the agency name and docket number. 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 discussion below. We will consider all comments received before the close of business on the comment closing date indicated above.

To the extent possible, we will also consider comments filed after the closing date.

**Docket:** For access to the docket to read background documents or comments received, go to <http://www.regulations.gov> at any time or to 1200 New Jersey Avenue, SE, West Building Ground Floor, Room W12-140, Washington, DC 20590, between 9 a.m. and 5 p.m., Monday through Friday, except Federal Holidays. Telephone: (202) 366-9826.

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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 the US DOT's complete Privacy Act Statement in the **Federal Register** published on April 11, 2000, (Volume 65, Number 70; Pages 19477–78) or you may visit <http://www.dot.gov/privacy.html>.

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 Chief Counsel, NHTSA, at the address given under FOR FURTHER INFORMATION CONTACT. In addition, you should submit two copies, from which you have deleted the claimed confidential business information, to Docket Management at the address given above. 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 our confidential business information regulation (49 CFR Part 512).

**FOR FURTHER INFORMATION CONTACT:** For technical issues, you may contact Dr. Chris Monk, phone: (202) 366-5195, or [chris.monk@dot.gov](mailto:chris.monk@dot.gov). Dr. Monk's mailing address is: National Highway Traffic Safety Administration, 1200 New Jersey Avenue SE, Washington, DC, 20590.

**SUPPLEMENTARY INFORMATION:** The final version of the Phase 2 Guidelines will not have the force and effect of law and will not be a regulation. Therefore, NHTSA is not required to provide notice and an opportunity for comment. NHTSA is doing so, however, to ensure that the final Phase 2 Guidelines benefit from the input of all knowledgeable and interested members of the public.

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## I. Executive Summary

### A. The Driver Distraction Safety Problem

In 2015,<sup>1</sup> 10 percent of the 35,092 traffic fatalities involved one or more distracted drivers, and these distraction-affected crashes resulted in 3,477 fatalities, an 8.8 percent increase from the 3,197 fatalities in 2014.<sup>2</sup> Of the 5.6 million non-fatal, police-reported crashes in 2014 (the most recent year for which detailed distraction-affected crash data is available), 16 percent were distraction-affected crashes, and resulted in 424,000 people injured.

The crash data indicate that visual-manual interaction (an action that requires a user to look away from the roadway and manipulate a button or interface) with portable devices, particularly cell phones, is often the main distraction for drivers involved in crashes. In 2014, there were 385 fatal crashes that involved the use<sup>3</sup> of a cell phone, resulting in 404 fatalities. These crashes represent 13 percent of the distraction-affected fatal crashes or 1.3 percent of all fatal crashes.<sup>4</sup> The data also indicate that there were a number of fatal crashes that involved the use of a device or object brought into the vehicle (some of which may also have been crashes that involved the use of a cell phone). This catch-all category includes crashes that involved the use of portable devices, such as navigation devices, in addition to other types of objects (e.g.,

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<sup>1</sup> NHTSA. (2016). *Traffic Safety Facts Research Note: 2015 Motor Vehicle Crashes: Overview* (DOT HS 812 318). Available at <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812318> (last accessed on 10/4/16).

<sup>2</sup> NHTSA. (2016). *Traffic Safety Facts Research Note: Distracted Driving 2014* (DOT HS 812 260) (hereinafter “*Traffic Safety Facts Research Note: Distracted Driving 2014*”). Available at <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812260> (last accessed on 10/4/16). 2014 data are the most recent data available.

<sup>3</sup> Use of a cell phone includes talking on or listening to a cell phone, dialing or texting on a cell phone, and other cell-phone-related activities.

<sup>4</sup> Other types of distraction-affected crashes include those caused by daydreaming, eating or drinking, smoking, and conversing with a passenger. See NHTSA. (2016). *Traffic Safety Facts Research Note: Distracted Driving 2014*.

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cigarette lighters). Of the 967,000 distraction-affected crashes in 2014, 7 percent (or 1.1 percent of all crashes) involved the use of cell phones and resulted in 33,000 people injured.<sup>5</sup>

## **B. What is Driver Distraction?**

Driver distraction is a specific type of inattention that occurs when drivers divert their attention away from the driving task to focus on another activity. This distraction can come from electronic devices, such as texting or emailing on cell phones or smartphones, and more traditional activities such as interacting with passengers, eating, or events external to the vehicle. Driver distraction can affect drivers in different ways, and can be broadly categorized into the following types:

- Visual distraction: Tasks that require the driver to look away from the roadway to visually obtain information;
- Manual distraction: Tasks that require the driver to take one or both hands off the steering wheel to manipulate a control, device, or other non-driving-related item;
- Cognitive distraction: Tasks that require the driver to avert their mental attention away from the driving task.

Tasks can involve one, two, or all three of these distraction types.

NHTSA is aware of the effect that these types of distraction can have on driving safety, particularly visual-manual distraction. At any given time, an estimated 542,073 drivers are using hand-held cell phones while driving.<sup>6</sup> Moreover, when sending or receiving a text message with a hand-held phone, the total time that a driver's eyes are focused off the road is 23 seconds on

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<sup>5</sup> *Id.*

<sup>6</sup> NHTSA. (2016). *Traffic Safety Facts Research Note: Driver Electronic Device Use in 2015*. (DOT HS 812 326). Available at <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812326> (last accessed on 10/4/16).

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average.<sup>7</sup> This means while traveling at 55 mph, a driver's eyes are off the road for more than a third of a mile for every text message sent or received.

### **C. NHTSA's Efforts to Reduce Driver Distraction**

As an agency committed to reducing deaths, injuries, and economic losses resulting from motor vehicle crashes, NHTSA has initiated, and continues to work toward eliminating crashes attributable to driver distraction. Most prominently, NHTSA and the United States Department of Transportation (US DOT) have encouraged efforts by states and other local authorities to pass laws prohibiting hand-held use of portable devices while driving. NHTSA, in conjunction with industry, local governments, and various public interest groups, has also taken numerous steps to educate the public about the dangers of distracted driving.

However, until distracted driving is eliminated, the agency must work in the real-world where many drivers continue to use their portable devices and other in-vehicle systems in unsafe ways while driving. Thus, NHTSA has also worked on how to mitigate the distraction that may be caused by these new technologies. In April 2010, NHTSA called for the development of voluntary guidelines addressing driver distraction caused by in-vehicle systems and portable devices.<sup>8</sup> This sentiment was reinforced by the US DOT's and NHTSA's June 2012 "Blueprint for Ending Distracted Driving."<sup>9</sup> The blueprint is a comprehensive approach to the distraction problem. The three steps outlined in the blueprint include: enacting and enforcing tough state laws on distracted driving, addressing technology, and better educating young drivers. All three

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<sup>7</sup> Fitch, G., et al. (2013). *The Impact of Hand-Held and Hands-Free Cell Phone Use on Driving Performance and Safety-Critical Event Risk* (DOT HS 811 757). Washington, DC: National Highway Traffic Safety Administration.

<sup>8</sup> NHTSA. (2010). *Overview of the National Highway Traffic Safety Administration's Driver Distraction Program* (DOT HS 811 299). Available at [http://www.nhtsa.gov/staticfiles/nti/distracted\\_driving/pdf/811299.pdf](http://www.nhtsa.gov/staticfiles/nti/distracted_driving/pdf/811299.pdf) (last accessed on 10/4/16).

<sup>9</sup> NHTSA. (2012). *Blueprint for Ending Distracted Driving* (DOT HS 811 629). Available at: <http://www.distraction.gov/downloads/pdfs/blueprint-for-ending-distracted-driving.pdf> (last accessed on 10/4/16).

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components are necessary to address the distraction issue. The Distraction Guidelines focus on step two by addressing technology.

The development of non-binding, voluntary guidelines for in-vehicle and portable devices is being implemented in three phases. The Phase 1 Driver Distraction Guidelines (Phase 1 Guidelines), released in 2013, cover visual-manual interfaces of electronic devices installed in vehicles as original equipment (OE).<sup>10</sup> The Phase 2 Driver Distraction Guidelines (Phase 2 Guidelines), which are the subject of this notice, would apply to visual-manual interfaces of portable and aftermarket devices.

While NHTSA is proposing the Phase 2 Guidelines, it is important to note that the agency continues to support state efforts to prohibit hand-held use of portable devices while driving. In proposing the Phase 2 Guidelines, NHTSA stresses that it does not encourage the hand-held use of portable devices while driving. While NHTSA acknowledges that there are many available technology solutions, state laws, and consumer information campaigns designed to help reduce distracted driving, the agency believes that an important way to help mitigate the real-world risk posed by driver distraction from portable devices is for these devices to have limited functionality and simplified interfaces when they are used by drivers while driving. This is especially true because some of these devices are intended to be used while driving and others have applications that are clearly meant to be used by drivers to complete the driving task. These Guidelines are, therefore, intended to reduce the potential distraction associated with hand-held portable and aftermarket device use while driving. The agency believes these Guidelines will provide a framework for portable device and application developers to take into account real-

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<sup>10</sup> 78 FR 24817 (Apr. 26, 2013). Available at <https://www.federalregister.gov/articles/2013/04/26/2013-09883/visual-manual-nhtsa-driver-distraction-guidelines-for-in-vehicle-electronic-devices> (last accessed on 10/4/16).



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world device use by consumers when driving. In addition, the agency notes that applications that are meant to be used by drivers while driving are likely to continue to be developed and made available.

While these Guidelines help manufacturers develop portable and aftermarket devices while keeping safe driving in mind, it remains the driver's responsibility to ensure the safe operation of the vehicle and to comply with all state traffic laws. This includes, but is not limited to laws that ban texting and/or the use of hand-held devices while driving. NHTSA and the US DOT support and will continue to support State and Federal efforts to combat distracted driving.

#### **D. The Proposed NHTSA Guidelines for Portable and Aftermarket Devices**

This notice announces the proposed Phase 2 Guidelines for Portable and Aftermarket Devices. The Phase 1 Guidelines for OE in-vehicle interfaces, discussed in detail below, provide the foundation for the proposed Phase 2 Guidelines. Phase 1 provided specific recommendations for minimizing the distraction potential from OE in-vehicle interfaces that involve visual-manual interaction. Particularly, the Phase 1 Guidelines are focused on recommending acceptance criteria for driver glance behavior where single average glances away from the forward roadway are 2 seconds or less and where the sum of the durations of all individual glances away from the forward roadway are 12 seconds or less while performing a testable task, such as selecting a song from a satellite radio station.

To the extent practicable, the Phase 2 Guidelines apply the Phase 1 recommendations to the visual-manual interfaces of portable devices (e.g., smartphones, tablets, and navigation devices) and aftermarket devices (i.e., devices installed in the vehicle after manufacture). Because there are both similarities and differences between OE interfaces and portable devices, the Phase 2 Guidelines primarily focus on portable devices. Due to the functional similarities

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between aftermarket devices and OE systems, the Phase 2 Guidelines direct manufacturers to the Phase 1 Guidelines.

The proposed Phase 2 Guidelines present two concurrent approaches for mitigating distraction associated with the use of portable and aftermarket devices by drivers. First, the proposed Guidelines recommend that portable and OE in-vehicle systems be designed so that they can be easily paired to each other and operated through the OE in-vehicle interface. Assuming that the OE in-vehicle interface conforms to the Phase 1 Guidelines, pairing would ensure that the tasks performed by the driver while driving meet the time-based, eye-glance task acceptance criteria specified in the Phase 1 Guidelines. Pairing would also ensure that certain activities that would inherently interfere with the driver's ability to safely control the vehicle would be locked out while driving (i.e., the "per se lock outs" referred to in the Phase 1 Guidelines). Those per se lock outs include:

- Displaying video not related to driving;
- Displaying certain graphical or photographic images;
- Displaying automatically scrolling text;
- Manual text entry for the purpose of text-based messaging, other communication, or internet browsing; and
- Displaying text for reading from books, periodical publications, web page content, social media content, text-based advertising and marketing, or text-based messages.

NHTSA encourages all entities involved with the engineering and design of pairing technologies to jointly develop compatible and efficient processes that focus on improving the usability and ease of connecting a driver's portable device with their in-vehicle system.

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The second approach recommended by the proposed Phase 2 Guidelines is that portable devices that do not already meet the NHTSA glance and per se lock out criteria when being used by a driver should include a Driver Mode that is developed by industry stakeholders (i.e., Operating System or handset makers).

The Driver Mode should present an interface to the driver that conforms with the Phase 1 Guidelines and, in particular, locks out tasks that do not meet Phase 1 task acceptance criteria or are among the per se lock outs listed above. The purpose of Driver Mode is to provide a simplified interface when the device is being used unpaired while driving, either because pairing is unavailable or the driver decides not to pair. The Guidelines recommend two methods of activating Driver Mode depending on available technology. The first option, and the one encouraged by the agency, is to automatically activate the portable device's Driver Mode when: (1) the device is not paired with the in-vehicle system, and (2) the device, by itself, or in conjunction with the vehicle in which it is being used, distinguishes that it is being used by a driver who is driving. The driver mode does not activate when the device is being used by a non-driver, e.g., passenger.<sup>11</sup>

NHTSA has learned that technologies to detect whether a driver or passenger is using a device have been developed but are currently being refined such that they can reliably detect whether the device user is the driver or a passenger and are not overly annoying and impractical.<sup>12</sup> Accordingly, the agency is proposing a second means of activation—manual

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<sup>11</sup> For purposes of this notice, “passenger” is a subset of “non-driver.” Non-drivers include not only personal vehicle passengers, but also people riding mass transit, bicycling, and the like. When referring to the specific type of vehicles this guidance is aimed at—light vehicles—the notice will often refer to those occupants as drivers and passengers and the technology that distinguishes between drivers and passengers in light vehicles as driver-passenger distinction technology.

<sup>12</sup> For further discussion of driver-passenger distinction technologies, see *infra* Section I.3.

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activation of Driver Mode—meaning that Driver Mode is activated manually by the user. The agency foresees this being a temporary option in the Phase 2 Guidelines until driver-passenger distinction technology is more mature, refined, and widely available. The agency is optimistic such technology can be implemented as soon as practicable.

Additionally, the Phase 2 Guidelines include recommendations for aftermarket devices—those devices that are intended to be permanently installed in the vehicle, which were not addressed in Phase 1. The proposed Phase 2 Guidelines suggest that aftermarket devices meet the same task acceptance criteria and other relevant recommendations as specified for OE interfaces in Phase 1.

Due to the close relationship between the Phase 1 and Phase 2 Guidelines, the agency is considering combining the two phases into a single document when the Phase 2 Guidelines are finalized. The agency requests comment on whether a single combined document would be easier for industry to use and the public at large to reference, or whether separate documents would be simpler.

Because these proposed Guidelines are voluntary and nonbinding, they will not require action of any kind, and for that reason they will not confer benefits or impose costs. Nonetheless, and as part of its continuing research efforts, NHTSA welcomes comments on the potential benefits and costs that would result from voluntary compliance with the Guidelines.

#### **E. Major Differences between the Proposed Phase 2 and Phase 1 NHTSA Guidelines**

The Phase 1 Guidelines recommend that interfaces and tasks determined to be more distracting than a specified level should not be accessible to the user while the user is driving. Similarly, conformance with the proposed Phase 2 Guidelines would result in drivers interacting

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with their paired portable devices through Phase 1-conforming OE, built-in interfaces. In many cases, it is up to the driver to pair his or her device with the vehicle's interface or, as in the case with many older vehicles, the vehicle does not have the capability to pair with a portable device, so the Phase 2 Guidelines also recommend that the portable device be put in Driver Mode for use while driving instead of the portable device's default interface.

There are several distinctions between portable devices and in-vehicles systems that result in different considerations between the Phase 1 and Phase 2 Guidelines. The first distinction is that many portable devices are designed with the intent of being used in a variety of contexts that may or may not include driving, whereas OE in-vehicle interfaces are designed specifically for use while driving (unless specific functions are inaccessible when the vehicle is in motion). As a result, it is important that the Phase 2 Guidelines account for the need to reliably identify when a portable device is in fact being used by the driver of a moving vehicle.

A second distinction between portable devices and in-vehicle systems is that the portable devices may be used by other vehicle occupants in locations where the driver cannot see or access the device, e.g., by a passenger in the back seat. In contrast, all of the interaction with the OE in-vehicle interface occurs in the vehicle, and the location of the interface (and whether the driver can access it) is known to the vehicle manufacturer when the interface is designed and installed.<sup>13</sup> These differences between the portable device and OE in-vehicle interface can be overcome with technological solutions, as described in greater detail below, potentially allowing for a Driver Mode that activates when the portable device is used by a driver while driving. This would allow for the device to be used in its full capacity in non-driving situations. Therefore,

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<sup>13</sup> The Phase 1 Guidelines explicitly exclude OE in-vehicle devices that cannot reasonably be reached or seen by the driver.

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NHTSA encourages the development and implementation of technologies that can distinguish between drivers and passengers.

A third distinction between portable devices and in-vehicle systems is that, if not paired with the in-vehicle system, portable devices can be placed and/or mounted in a variety of different locations in the vehicle. There is also variability in the placement of an aftermarket device – although to a lesser extent than for portable devices, since aftermarket devices are confined to the available locations on the vehicle, such as inside the center stack or on top of the dashboard. NHTSA has elected not to include recommendations concerning whether or where a portable device should be mounted in this proposed set of guidelines, but we seek comment on whether we should include them at a later date and whether there are already other entities/programs that provide advice on where to mount devices safely.

A fourth distinction is that the user-interface experience with portable devices can be different from built-in and installed aftermarket systems due to a wide range of device characteristics (e.g., smaller screens on portable devices). In addition, users often use their thumbs to interact with touchscreens on hand-held portable devices, whereas the index finger is more commonly used with built-in and installed aftermarket systems. While these differences in device characteristics may affect a driver's interaction with the device, NHTSA believes it is unnecessary to address design issues at the characteristic level for the Phase 2 Guidelines, because, regardless of their specific features, portable devices will be used while within reach of the driver and viewed at a downward viewing angle. Rather, NHTSA maintains its focus on the Phase 1 test procedures and acceptance criteria in Phase 2 for paired and unpaired portable devices, as well as installed aftermarket devices.

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The variability of potential locations for portable and aftermarket devices has implications for testing procedures to determine conformance with our recommendations concerning Driver Mode. Specifically, the proposed Phase 2 Guidelines' test procedure for when the device is in Driver Mode includes recommendations about the placement of the portable electronic devices during testing. In order to address the issues mentioned above regarding the variability of the portable device's location and driver's access to its screen, the proposed test procedure recommends that unpaired portable devices be tested in a mounted location that is easy for the driver to reach and is based on driver viewing angle specified in Phase 1. NHTSA has included a general recommended testing location for unpaired portable devices but seeks comment on whether a location could be specified that would not result in infinite possibilities or be too particular to any one device or vehicle.

For aftermarket devices that are intended to be permanently installed in the vehicle, the proposed test procedure recommends that they be tested in the installation location prescribed by the device manufacturer.

#### **F. Phase 2 Outreach Efforts**

NHTSA is committed to reducing deaths and injuries resulting from motor vehicle crashes from distraction by encouraging the development of devices that can be safer if used while driving. As part of the ongoing process of harmonizing with industry standards and practices, NHTSA hosted a public meeting on March 12, 2014, to bring together vehicle manufacturers and suppliers, portable and aftermarket device manufacturers, portable and aftermarket device operating system providers, cellular service providers, industry associations, application developers, researchers, and consumer groups to discuss technical issues regarding the agency's development of the Phase 2 Driver Distraction Guidelines for portable and

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aftermarket devices. NHTSA held the public meeting to ensure the stakeholders' interests were communicated and considered in the development of the Phase 2 Guidelines. NHTSA has met with portable and aftermarket device manufacturers through the Consumer Technology Association (CTA)<sup>14</sup> working group as well as individual meetings as part of an ongoing effort to enhance the cooperation and coordination of the Distraction Guidelines. Likewise, NHTSA participated in U.S. Senator John (Jay) D. Rockefeller's "Over-Connected and Behind the Wheel: A Summit on Technological Solutions to Distracted Driving" on February 6, 2014. Sen. Rockefeller, chair of the Senate Committee on Commerce, Science, and Transportation, hosted the summit to address potential technological solutions for minimizing driver distraction. NHTSA has also met with majority and minority staff members from several House and Senate Committees, including the House Energy and Commerce Committee, the House Transportation and Infrastructure Committee, the House Appropriations Committee, the Senate Commerce Committee, and the Senate Appropriations Committee, in July 2014 to provide background on the Phase 2 Guidelines and answer questions.

## **II. Background**

### **A. Overview**

Driver distraction is a safety problem in the United States. The latest crash and fatality data implicate driver distraction in 10 percent of fatal crashes, 18 percent of injury crashes, and 16 percent of all motor vehicle traffic crashes in 2014.<sup>15</sup> The 2014 data show that cell phones were directly linked to 385 fatal crashes (resulting in 404 fatalities), which is 13 percent of all

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<sup>14</sup> Following NHTSA's Phase 2 Guidelines public meeting but before the issuance of this notice, the Consumer Electronics Association changed its name to the Consumer Technology Association. This notice will refer to that entity as the Consumer Technology Association or CTA unless the name is used in a publication title or citation.

<sup>15</sup> *Traffic Safety Facts Research Note: Distracted Driving 2014.*



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distraction affected crashes and 1.3 percent of all fatal crashes.<sup>16</sup> The following sections outline the definition of driver distraction, the prevalence of portable device use in motor vehicles, and the crash and crash risk data associated with distraction from all devices in general and portable device use specifically. This section also outlines the various efforts from the US DOT, industry, and safety advocates to combat the distraction problem. These efforts include improving our understanding of the distraction problem, the implementation of legislation and enforcement approaches, driver education and public awareness campaigns, and guidelines for industry to develop less distracting devices and driver-vehicle interfaces.

## **B. Definition and Scope of Driver Distraction**

Driver distraction is a specific type of inattention that occurs when drivers divert their attention away from the driving task to focus on another activity. These distractions can come from electronic devices, such as navigation systems and cell/smartphones, and from more conventional activities, such as viewing sights or events external to the vehicle, interacting with passengers, and/or eating. These distracting tasks can affect drivers in different ways, and can be broadly categorized into the following types:

- Visual distraction: Tasks that require the driver to look away from the roadway to visually obtain information;
- Manual distraction: Tasks that require the driver to take one or both hands off the steering wheel to manipulate a control, device, or other non-driving-related item;

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<sup>16</sup> Because of the way crash data is reported and collected, there are limitations on how distraction-affected crashes, including those involving cell phone use, are represented. For an explanation of potential reasons for underreporting, please see *Traffic Safety Facts Research Note: Distracted Driving 2014* at 5-6.

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- Cognitive distraction: Tasks that require the driver to avert their mental attention away from the driving task.

Any given task can involve one, two, or all three of these types of distraction. NHTSA is aware of the effect that these types of distraction can have on driving safety, particularly visual-manual distraction.

The impact of distraction on driving is determined from multiple criteria, the type and level of distraction, and the frequency and duration of task performance. Even if performing a task results in a low level of distraction, a driver who engages in it frequently, or for long durations, may increase the crash risk to a level comparable to that of a more difficult task performed less often.

### **C. Prevalence of Portable Device Use while Driving**

NHTSA is concerned about the role of portable electronic devices in distracted driving crashes. NHTSA has been monitoring drivers' use of portable devices through its National Occupant Protection Use Survey (NOPUS),<sup>17</sup> which involves the direct observation of driver electronic device use at probabilistically-sampled intersections. The most recent available NOPUS data from 2015 showed that 2.2 percent of drivers were observed manipulating hand-held devices, 3.8 percent of drivers were observed holding cell phones to their ears while driving, and 0.6 percent of drivers were observed speaking into visible headsets while driving. Notably, the percentage of drivers visibly manipulating hand-held devices has nearly quadrupled from 0.6 percent in 2009 to 2.2 percent in 2015, whereas the percentage of drivers holding cell phones decreased from 5 percent in 2009 to 3.8 percent in 2015. The percentage of drivers speaking into

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<sup>17</sup> NHTSA. (2016). *Traffic Safety Facts Research Note: Driver Electronic Device Use in 2015*(DOT HS 812 326). Available at <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812326> (last accessed on 10/4/16).

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visible headsets has fluctuated from 0.6 percent in 2009, to as high as 0.9 percent in 2010, and as low as 0.4 percent in 2014.

Surveys of drivers indicate even higher rates of portable device use while driving. According to a 2012 survey published by NHTSA,<sup>18</sup> 14 percent of drivers reported reading text messages and email while driving at least some of the time, and 10 percent of drivers reported sending text or email messages while driving at least some of the time. In addition, almost half of drivers reported answering their cell phone when driving at least some of the time, and more than half of drivers who reported answering their phones while driving said they will continue to drive while talking on the phone. The survey further indicated that almost a quarter of drivers reported that they are at least sometimes willing to make a cell phone call while driving. As will be seen, these visual-manual distraction activities are associated with increased crash and near-crash risk.

NHTSA's 2013 Cell Phone Naturalistic Driving Study<sup>19</sup> found that 28 percent of the calls and 10 percent of the text messages in the participant cell phone records overlapped with periods of driving. In terms of visual-manual task duration while interacting with the cell phone, dialing on a hand-held cell phone lasted 12.4 seconds (s), on average, while pushing a button to begin a hands-free cell phone call (either with an aftermarket "portable" hands-free device or with a OE built-in, hands-free connection) took significantly less time (averages were 2.9 s and 4.6 s, respectively). Texting interactions lasted 36.4 s, on average (Min = 0.3 s, Max = 450.1 s), while driving at speeds above 8 km/h (approximately 5 mph). The study also assessed call duration as

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<sup>18</sup> Schroeder, P., Meyers, M., & Kostyniuk, L. (2013). *National Survey on Distracted Driving Attitudes and Behaviors – 2012* (DOT HS 811 729). Washington, DC: National Highway Traffic Safety Administration.

<sup>19</sup> Fitch, G., et al. (2013). *The Impact of Hand-Held and Hands-Free Cell Phone Use on Driving Performance and Safety-Critical Event Risk* (DOT HS 811 757). Washington, DC: National Highway Traffic Safety Administration.

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a function of hand-held, portable hands-free (e.g., aftermarket headset), and integrated hands-free (e.g., wireless connection to vehicle system). When driving at speeds above 8 km/h (approximately 5 mph), drivers talked longer on portable hands-free cell phones (4.96 min on average) than on integrated hands-free cell phones (3.78 minutes on average) or hand-held cell phones (3.00 min on average). However, the study found no differences in the number of text messages made per minute as a function of hand-held, portable hands-free, and integrated hands-free cell phones.

In a more recent survey by the AAA Foundation for Traffic Safety,<sup>20</sup> which focused on driving habits during the 30 days prior to the survey, 34.7 percent of drivers reported reading a text or email messages while driving, and 25.8 percent of drivers reported typing or sending text or email messages while driving. Additionally, 67.1 percent of drivers reported talking on a cell phone (of any kind, including while using a wireless connection and speaker phone) while driving during this period. These data show that many drivers continue to engage in visual-manual distraction activities with their portable devices while driving. This is concerning because research by NHTSA and others suggests that visual-manual manipulation of devices while driving dramatically increases crash risk.

The portable device market generally consists of portable devices including smartphones, tablets, navigation devices, and portable music players (e.g., mp3 players). The aftermarket device market generally consists of products that are installed in a vehicle after its initial purchase, such as car stereos and navigation systems. Access to content (such as music and

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<sup>20</sup> Hamilton, B., Arnold, L., & Tefft, B. (2013). Distracted Driving and Perceptions of Hands-Free Technologies, AAA Foundation for Traffic Safety, Available at <https://www.aaafoundation.org/sites/default/files/2013%20TSCI%20Cognitive%20Distraction.pdf> (last accessed on 10/4/16).

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podcasts) has greatly increased over recent years, as have the capabilities of these devices and the public's desire to stay connected through them while driving. Accordingly, the scope of stakeholders has grown to include automotive OE manufacturers, handset (e.g., smartphone) manufacturers, application (app) developers, wireless carriers, and software operating system providers. Through various meetings with these wide-ranging stakeholders, NHTSA recognizes the complexity of this stakeholder "ecosystem" and that distraction guidelines are currently not available for designing portable device user interfaces for safe use while driving. As a result, the Distraction Guidelines will provide a uniform safety framework for these stakeholders when integrating or developing their products for driving use.

#### **D. Driver Distraction Safety Problem**

The significant safety impact of distracted driving is evident from NHTSA's crash data, which comes from the Fatality Analysis Reporting System (FARS)<sup>21</sup> and the National Automotive Sampling System (NASS) General Estimates System (GES).<sup>22</sup> In 2014,<sup>23</sup> 10 percent of all fatal crashes involved one or more distracted drivers,<sup>24</sup> and these distraction-affected crashes<sup>25</sup> resulted in 3,197 fatalities.<sup>26</sup> This number increased 8.8 percent to 3,477 fatalities in 2015.<sup>27</sup> Of the 6 million non-fatal, police-reported crashes in 2014, 16 percent (967,000) were distraction-affected crashes and resulted in 431,000 people injured. Tables 1 and

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<sup>21</sup> FARS is a census of all fatal crashes that occur on the roadways of the United States of America. It contains data on all fatal crashes occurring in all 50 states as well as the District of Columbia and Puerto Rico.

<sup>22</sup> NASS GES contains data from a nationally-representative sample of police-reported crashes. It contains data on police-reported crashes of all levels of severity, including those that result in fatalities, injuries, or only property damage. National numbers of crashes calculated from NASS GES are estimates.

<sup>23</sup> *Traffic Safety Facts Research Note: Distracted Driving 2014*.

<sup>24</sup> 3,000 distracted drivers were involved in these fatal crashes.

<sup>25</sup> A distraction-affected crash is any crash in which a driver was identified as distracted at the time of the crash.

<sup>26</sup> 10 percent of all crash fatalities (32,675 fatalities overall in 2014).

<sup>27</sup> NHTSA. (2016). *Traffic Safety Facts Research Note: 2015 Motor Vehicle Crashes: Overview* (DOT HS 812 318). Available at <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812318> (last accessed on 10/4/16).

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2 quantify the effects of distraction on fatal crashes from 2010 to 2014<sup>28</sup> and non-fatal crashes from 2007 through 2014.<sup>29</sup> These data show that distraction-affected fatalities and crashes continue to be a concern, and that NHTSA’s ongoing efforts to address driver distraction from multiple approaches, including through its Guidelines, are warranted.

**Table 1 – Fatal Crashes Involving Distraction<sup>23</sup>  
2010– 2014  
(FARS)**

Year	Fatal Crashes		Fatalities		Drivers Involved in Distraction-Affected Crashes?	
	Overall	Distraction-Affected (% of Total Crashes)	Overall	In Distraction-Affected Crashes (% of Total Fatalities)	Overall	Distressed Drivers (% of Total Drivers)
<b>2010</b>	30,296	2,993 (10%)	32,885	3,092 (9%)	44,440	2,912 (7%)
<b>2011</b>	29,867	3,047 (10%)	32,367	3,331 (10%)	43,668	3,085 (7%)
<b>2012</b>	31,006	3,098 (10%)	33,782	3,328 (10%)	45,337	3,119 (7%)
<b>2013</b>	30,203	2,910 (10%)	32,894	3,154 (10%)	44,574	2,959 (7%)
<b>2014</b>	29,989	2,955 (10%)	32,675	3,179 (10%)	44,583	3,000 (7%)

**Table 2 – Non-Fatal Police Reported Crashes Involving Distraction<sup>23</sup>  
2007 – 2014  
(GES)**

Year	Non-Fatal Crashes		People Injured		
	Overall	Distraction-Affected (% of Total Crashes)	Overall	In Distraction-Affected Crashes (% of Total Injured)	Cell Phone Use (% of People Injured in Distraction-Affected Crashes)

<sup>28</sup> Because of changes made in 2010 to the coding of distracted driving in FARS, distraction-affected crash data from FARS for 2010 through 2014 cannot be compared to distracted-driving-related data from FARS from previous years.

<sup>29</sup> The coding of distracted driving in FARS and NASS GES was unified beginning in 2010. Although this resulted in a coding change for FARS, NASS GES coding did not change. Accordingly, NASS GES data from 2007 through 2014 can be compared.

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<b>2007</b>	5,986,000	998,000 (17%)	2,491,000	448,000 (18%)	Unavailable
<b>2008</b>	5,776,000	964,000 (17%)	2,346,000	466,000 (20%)	Unavailable
<b>2009</b>	5,474,000	954,000 (17%)	2,217,000	448,000 (20%)	Unavailable
<b>2010</b>	5,389,000	897,000 (17%)	2,239,000	416,000 (19%)	24,000 (6%)
<b>2011</b>	5,308,000	823,000 (15%)	2,217,000	387,000 (17%)	21,000 (5%)
<b>2012</b>	5,584,000	905,000 (16%)	2,362,000	421,000 (18%)	28,000 (7%)
<b>2013</b>	5,657,000	901,000 (16%)	2,313,000	424,000 (18%)	34,000 (8%)
<b>2014</b>	6,035,000	964,000 (16%)	2,338,000	431,000 (18%)	33,000 (8%)

## **E. Driver Distraction and Portable Devices**

### **1. Crash Data**

The crash data indicate that the use of portable and aftermarket devices, particularly cell phones, is often a leading distraction for drivers involved in crashes (note that smartphones reached significant market presence beginning in 2007). In 2014, there were 385 fatal crashes that involved the use of a cell phone, though it is possible that this is an underestimate due to the difficult nature in relating cell phone use to crashes at the crash scene. These cell phone fatal crashes represented 13 percent of the total distraction-affected fatal crashes. The data also indicate that there were 75 distraction-affected fatal crashes in 2014 that involved the driver using or reaching for a device or object brought into the vehicle. This catch-all category of fatal distraction crashes includes crashes that involved the use of portable devices such as navigation devices in addition to other types of objects (e.g., pocket cigarette lighters).

Of the 967,000 distraction-affected crashes in 2014, 8 percent (69,000 crashes) involved the use of cell phones, resulting in 33,000 people injured. The tables below quantify the effects of cell phone or other device use on fatal crashes from 2010 through 2014 and non-fatal crashes

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that involved the use of cell phones or other devices from 2007 through 2014.<sup>30</sup> As with Tables 1 and 2, these data show that cell phone-affected fatalities and crashes continue to pose a risk to motor vehicle safety.

**Table 3 – Fatal Crashes Involving the Use of Cell Phones<sup>31,32,33,34,35</sup>  
2010– 2014  
(FARS)**

Year	Distraction-Affected Fatal Crashes Involving the Use of a Cell Phone				Fatal Crashes Involving Use of a Device/Object Brought into Vehicle Other than a Cell Phone
	Crashes	% of Distraction-Affected Crashes	Fatalities	% of Fatalities in Distraction-Affected Crashes	
2010	366	12%	408	13%	70
2011	354	12%	385	12%	53
2012	378	12%	415	12%	66
2013	411	14%	455	14%	70
2014	385	13%	404	13%	75

\* The attributes “Use of a Cell Phone” and “Use of or Reaching for Device/Object Brought into Vehicle” are not mutually exclusive and crashes may involve one or both of these attributes.

<sup>30</sup> Identification of specific distractions has presented challenges, both within NHTSA’s data collection and on police accident reports. Therefore, a large portion of the crashes that are reported to involve distraction do not have a specific behavior or activity listed; rather they specify “distraction/inattention, details unknown.” Some portion of these crashes could have involved a portable or aftermarket device.

<sup>31</sup> NHTSA. (2012). *Traffic Safety Facts Research Note: Distracted Driving 2010* (DOT HS 811 650). Available at <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/811650> (last accessed on 10/4/16).

<sup>32</sup> NHTSA. (2013). *Traffic Safety Facts Research Note: Distracted Driving 2011* (DOT HS 811 737). Available at <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/811737> (last accessed on 10/4/16).

<sup>33</sup> NHTSA. (2014). *Traffic Safety Facts Research Note: Distracted Driving 2012* (DOT HS 812 012). Available at <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812012> (last accessed on 10/4/16).

<sup>34</sup> NHTSA. (2015). *Traffic Safety Facts Research Note: Distracted Driving 2013* (DOT HS 812 132). Available at <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812132> (last accessed on 10/4/16).

<sup>35</sup> *Traffic Safety Facts Research Note: Distracted Driving 2014*



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**Table 4 – Non-Fatal Police Reported Crashes Involving Distraction<sup>31,34</sup>  
2007 – 2014  
(GES)**

Year	Distraction-Affected Non-Fatal Crashes Involving the Use of a Cell Phone			
	Crashes	% of Distraction-Affected Crashes	People Injured	% of People Injured in Distraction-Affected Crashes
2007	49,000	5%	24,000	5%
2008	49,000	5%	29,000	6%
2009	46,000	5%	24,000	5%
2010	47,000	5%	24,000	6%
2011	50,000	6%	21,000	5%
2012	60,000	7%	28,000	7%
2013	71,000	8%	34,000	8%
2014	69,000 <sup>36</sup>	7%	33,000	8%

## 2. Crash Risk Associated with Portable Device Use

The majority of crash risk data related to portable devices has focused on cell phones. However, it is important to note that cell phones have evolved from a portable hand-held phone designed specifically for voice calls to a device that can be used for various forms of communication, entertainment, and access to content. Examples include applications developed for messaging, photo-sharing, gaming, social networking, navigation, and other location-based services. While these features are not intended to be used while driving, they remain just as accessible to the driver in driving situations as any other feature on a smartphone. Whether on smartphones, tablet computers, or other portable electronic devices, access to more content can lead to more visual-manual distraction, which the studies summarized below consistently show is associated with higher levels of crash and near-crash risk, and decreased driving performance.

<sup>36</sup> Possible reasons for the uptick between 2010 and 2014 include the increasing volume of smartphones in the market and better distraction-related crash reporting.

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The agency's distraction focus has been on research and test procedures that measure aspects of driver performance having the strongest connection to crash risk. As described below, interactions with a distraction task that require visual attention (i.e., eyes-off-road time) and manual operations (e.g., button presses) consistently show association with increased crash and near-crash risk in naturalistic driving studies and decreased driving performance in simulator and test-track studies. The research summarized below provides a brief overview of the distraction safety problem as manifested in crashes and the relationship between visual-manual distraction and crash risk. There are also many simulator and test-track studies that show the negative effects of distracted driving have on driving performance that are not included in the summary below.<sup>37</sup>

A key component of the NHTSA distraction plan is to understand the crash risk of drivers using a cell phone while driving. Early epidemiological research reported that using a cell phone, hand-held or hands-free, was associated with a quadrupling of the risk of injury and property damage crashes.<sup>38,39</sup> Subsequent naturalistic driving studies that investigated the risk of drivers performing specific cell phone subtasks all found that increased crash risk and safety critical event risk (SCE) were associated with visual-manual operations such as text messaging and dialing. An SCE was defined as a crash (where contact was made with another object), a near-crash (where a crash was avoided by a rapid evasive maneuver), or a crash-relevant conflict (where a crash avoidance response was performed that was less severe than a rapid evasive

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<sup>37</sup> A sample of simulator and test-track study reports can be found at [www.distraction.gov](http://www.distraction.gov).

<sup>38</sup> McEvoy, S. P., Stevenson, M. R., McCart, A. T., Woodward, M., Haworth, C. Palamara, P., et al. (2005). Role of portable phones in motor vehicle crashes resulting in hospital attendance: A case-crossover study. *British Journal of Medicine*, 331, 428–434.

<sup>39</sup> Redelmeier, D. A., & Tibshirani, R. J. (1997). Association between cellular-telephone calls and motor vehicle collisions. *The New England Journal of Medicine*, 336, 453–458.

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maneuver, but greater in severity than a “normal maneuver”). However, in the naturalistic studies, non-visual-manual operations, such as conversing on a cell phone, were not found to be associated with an increase in crash risk.<sup>40, 41,42</sup> These results were observed for both commercial motor vehicle and light-vehicle drivers, as well as across broad classifications of low, moderate, and high driving task demands.<sup>43</sup> In contrast, research conducted in simulators and on test tracks has found driving performance decrements when driving while talking on a cell phone.<sup>44, 45, 46, 47</sup> These experiments, however, cannot directly connect their results to SCE risk.

In April 2013, NHTSA published a study<sup>48</sup> on the impact of hand-held and hands-free cellular phone use on crash risk and driving performance. The study investigated the effects of distraction from the use of three types of cell phones while driving: (1) hand-held (HH), (2) portable hands-free (PHF), and (3) integrated hands-free (IHF). Seventy-five percent of the phones used in the study could be classified as smartphones. Naturalistic driving data was collected from 204 drivers who each voluntarily took part in the study for an average of 31 days

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<sup>40</sup> Hickman, J. S., Hanowski, R. J., & Bocanegra, J. (2010). *Distraction in Commercial Trucks and Buses: Assessing Prevalence and Risk in Conjunction with Crashes and Near-Crashes* (FMCSA-RRR-10-049). Washington, DC: Federal Motor Carrier Safety Administration.

<sup>41</sup> Klauer, S. G., et al. (2006). *The Impact of Driver Inattention on Near-Crash/Crash Risk: An Analysis Using the 100-Car Naturalistic Driving Study Data* (DOT HS 810 594). Washington, DC: National Highway Traffic Safety Administration.

<sup>42</sup> Olson, R. L., Hanowski, R. J., Hickman, J. S., & Bocanegra, J. (2009). *Driver Distraction in Commercial Vehicle Operations: Final Report*. Contract DTMC75-07-D-00006, Task Order 3. Washington, D.C.: Federal Motor Carrier Safety Administration.

<sup>43</sup> Fitch, G. M. & Hanowski, R. J. (2011). The risk of a safety-critical event associated with portable device use as a function of driving task demands. *Proceedings of the 2nd International Conference on Driver Distraction and Inattention*.

<sup>44</sup> Atchley, P. & Dressel, J. (2004). Conversation limits the functional field of view. *Human Factors: The Journal of the Human Factors and Ergonomics Society* 46(4), 664-673.

<sup>45</sup> Drews, F. A., Pasupathi, M., & Strayer, D. L. (2004). Passenger and cell-phone conversations in simulated driving. *Proceedings of the Human Factors and Ergonomics Society 48th Annual Meeting* 48, 2210-2212.

<sup>46</sup> Horrey, W. J., Lesch, M. F., & Garabet, A. (2008). Assessing the awareness of performance decrements in distracted drivers. *Accident Analysis & Prevention*, 40(2), 675-682. doi: 10.1016/j.aap.2007.09.004.

<sup>47</sup> Strayer, D. L., Drews, F. A., & Johnston, W. A. (2003). Cell phone-induced failures of visual attention during simulated driving. *Journal of Experimental Psychology: Applied*, 9(1), 23 - 32.

<sup>48</sup> Fitch, G., et al. (2013). *The Impact of Hand-Held and Hands-Free Cell Phone Use on Driving Performance and Safety-Critical Event Risk* (DOT HS 811 757). Washington, DC: National Highway Traffic Safety Administration.

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from February 2011 to November 2011. All participants reported talking on a cell phone while driving at least once per day prior to entering the study. With the participants' knowledge, data acquisition systems were installed in their personal vehicles and continuously recorded video of the driver's face, the roadway, and various kinematic data such as the vehicle speed, acceleration, headway information to lead vehicles, steering, and location. This was the first naturalistic driving study to date in which participants provided their cell phone records for analysis. The cell phone records allowed the determination of when drivers used their cell phone, while the video data allowed the determination of the type of cell phone used, how long it was used for, and what subtasks were executed. The result was a rich data set of driver behavior and performance when using a cell phone.

SCE risk was investigated using two approaches: (1) a risk rate approach, which assessed the SCE risk relative to general driving (where non-cell-phone secondary tasks could occur), and (2) a case-control approach, which assessed the SCE risk relative to "just driving" (where non-driving-related secondary tasks did not occur). The risk rate results are shown below (see the full report for the case-control results along with driver performance results). The odds ratio indicates the relative risk of an SCE during the listed activity. An odds ratio value of 1.0 is considered equivalent to driving while not distracted. Odds ratio values above 1.0 indicate elevated risk and values below 1.0 indicate decreased risk, though the difference must be statistically significant (i.e., reliably different) for conclusions to be drawn about the associated risk of that activity.

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**Table 5. SCE Risk Associated with Cell Phone Use as Computed through Risk Rate Approach**

Subtask	Odds Ratio	Lower Confidence Limit (LCL)	Upper Confidence Limit (UCL)	p-value
Cell Phone Use – Collapsed across types	1.32	0.96	1.81	.0917
Visual-Manual	<b>2.93*</b>	1.90	4.51	< .0001
Call-related Visual-Manual	<b>3.34*</b>	1.76	6.35	.0003
Text-related Visual-Manual	<b>2.12*</b>	1.14	3.96	.0184
Talking/Listening	0.84	0.55	1.29	.4217
Talking/Listening Hand-held	0.84	0.47	1.53	.5764
Talking/Listening Portable Hands-free	1.19	0.55	2.57	.6581
Talking/Listening Integrated Hands-free	0.61	0.27	1.41	.2447
HH Cell Phone Use (Collapsed)	<b>1.73*</b>	1.20	2.49	.0034
PHF Cell Phone Use (Collapsed)	1.06	0.49	2.30	.8780
IHF Cell Phone Use (Collapsed)	0.57	0.25	1.31	.1859

\* Indicates a difference at the .05 level of significance

The risk rate approach generates a powerful estimate of risk by using all accounts of when cell phones were used while driving. However, it cannot assess the SCE risk relative to “just driving” (defined as driving void of all non-driving-related secondary tasks) without the availability of estimates of the propensity for each potential secondary task that is performed while driving. The case-control approach was thus used to address this limitation. A total of 2,308 baseline periods were randomly sampled based on each driver’s driving time in the study. This number was selected to be at least four times the 342 SCEs that were identified. The odds of an SCE occurring during specific cell phone subtasks were then compared to the odds of an SCE occurring when just driving. Note that “just driving” was only found in 46 percent of the baseline periods. Table 6 presents the odds ratios (ORs) and 95-percent confidence limits for various cell phone subtasks. As in the previous risk analysis, only VM subtasks performed on an HH cell phone were found to be associated with an increased SCE risk. Conversing on a cell phone (i.e., any type of cell phone) was not found to increase SCE risk.

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**Table 6. SCE Risk Associated with Cell Phone Use as Computed through Case-Control Approach**

Subtask	OR	LCL	UCL	#SCE	#Baseline periods (BL)	SCE Total	BL Total	Total
Cell Phone Use - Collapsed	1.1	0.8	1.53	57	358	211	1426	1637
Visual-Manual Subtasks	<b>1.73*</b>	1.12	2.69	29	116	183	1184	1367
Text messaging/Browsing	1.73	0.98	3.08	16	64	170	1132	1302
Locate/Answer	<b>3.65*</b>	1.67	8	10	19	164	1087	1251
Dial	0.99	0.12	8.11	1	7	155	1075	1230
Push to Begin/End Use	0.63	0.08	4.92	1	11	155	1079	1234
End HH Phone Use	1.26	0.43	3.71	4	22	158	1090	1248
Talking on Cell Phone	0.75	0.49	1.15	28	259	182	1327	1509
HH Talking	0.79	0.43	1.44	13	114	167	1182	1349
PHF Talking	0.73	0.36	1.47	9	86	163	1154	1317
IHF Talking	0.71	0.3	1.66	6	59	160	1127	1287
HH Cell Phone Use (Collapsed)	1.39	0.96	2.03	41	204	195	1272	1467
PHF Cell Phone Use (Collapsed)	0.79	0.4	1.55	10	88	164	1156	1320
IHF Cell Phone Use (Collapsed)	0.62	0.26	1.46	6	67	160	1135	1295

\* Indicates a difference at the .05 level of significance

The overall results from the study presented a clear finding: visual-manual subtasks performed on hand-held cell phones degraded driver performance and increased SCE risk. Although current hands-free cell phone interfaces allow drivers to communicate with their voices, there is a concern that they still require visual-manual interactions. In fact, drivers in this study frequently initiated hands-free calls and performed other visual-manual operations (e.g., texted) with a hand-held cell phone. A notable finding was that approximately half of the hands-free cell phone interactions in this study were found to involve visual-manual interactions with the hand-held phone. These findings that implicate visual-manual distraction as the primary

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distraction risk are consistent with previous naturalistic driving investigations of crash risk related to cell phone subtasks,<sup>49</sup> including the 100-Car Naturalistic Driving Study.<sup>50, 51, 52, 53</sup>

## **F. Overview of Efforts to Combat Driver Distraction**

Recognizing the distraction safety issue outlined above, NHTSA published the “Overview of the National Highway Traffic Safety Administration’s Driver Distraction Program,”<sup>54</sup> in April 2010. This plan consisted of four main initiatives:

1. Improve the understanding of the extent and nature of the distraction problem. This includes improving the quality of data NHTSA collects about distraction-related crashes and improving analysis techniques.
2. Reduce the driver workload associated with performing tasks using original equipment, aftermarket, and portable in-vehicle electronic devices by working to limit the visual, manual, and cognitive demand associated with secondary tasks performed using these devices. Better device interfaces will minimize the time and effort involved in a driver performing a task using the device. Minimizing the workload associated with performing secondary tasks with a device will

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<sup>49</sup> Hickman, J. S., Hanowski, R. J., & Bocanegra, J. (2010). *Distraction in Commercial Trucks and Buses: Assessing Prevalence and Risk in Conjunction with Crashes and Near-Crashes* (FMCSA-RRR-10-049). Washington, DC: Federal Motor Carrier Safety Administration.

<sup>50</sup> Neale, V. L., et al. (2005). An Overview of the 100-Car Naturalistic Study and Findings, ESV Paper 05-0400.

<sup>51</sup> Dingus, T. A. et al. (2006). *The 100-Car Naturalistic Driving Study, Phase II – Results of the 100-Car Field Experiment* (DOT HS 810 593). Washington, DC: National Traffic Safety Administration.

<sup>52</sup> Klauer, S. G., et al. (2006). *The Impact of Driver Inattention on Near-Crash/Crash Risk: An Analysis Using the 100-Car Naturalistic Driving Study Data* (DOT HS 810 594). Washington, DC: National Traffic Safety Administration.

<sup>53</sup> Klauer, S. G., et al. (2010). *An Analysis of Driver Inattention Using a Case-Crossover Approach On 100-Car Data: Final Report* (DOT HS 811 334). Washington, DC: National Traffic Safety Administration.

<sup>54</sup> NHTSA. (2010). *Overview of the National Highway Traffic Safety Administration’s Driver Distraction Program*, (DOT HS 811 299). Available at [http://www.nhtsa.gov/staticfiles/nti/distracted\\_driving/pdf/811299.pdf](http://www.nhtsa.gov/staticfiles/nti/distracted_driving/pdf/811299.pdf) (last accessed on 10/4/16).

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permit drivers to maximize the attention they focus toward the primary task of driving. NHTSA's Driver Distraction Guidelines fall under this initiative.

3. Keep drivers safe through the introduction of crash avoidance technologies.

These include the use of crash warning systems to re-focus the attention of distracted drivers as well as vehicle-initiated (i.e., automatic) braking and steering to prevent or mitigate distraction-affected crashes. Research<sup>55, 56, 57, 58</sup> on how best to warn distracted drivers in crash imminent situations is also supporting this initiative. NHTSA is also performing a large amount of research on automatic emergency braking technologies (e.g., crash warning systems or automatic braking systems) and dynamic brake support.

4. Educate drivers about the risks and consequences of distracted driving. This includes targeted media messages, drafting and publishing sample text-messaging laws for consideration and possible use by the states, testing high-visibility enforcement programs, and publishing guidance for a ban on text messaging by Federal government employees while driving.

In June 2012, the US DOT released a "Blueprint for Ending Distracted Driving."<sup>59</sup> This was an update of the "Overview of the National Highway Traffic Safety Administration's Driver Distraction Program." These two documents summarize NHTSA's planned steps to "help in its

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<sup>55</sup> Lerner, N., et al. (2011). *Crash Warning Interface Metrics: Final Report* (DOT HS 811 470a). Washington, DC: National Traffic Safety Administration.

<sup>56</sup> Robinson, E., et al. (2011). *Crash Warning Interface Metrics: Task 3 Final Report: Empirical Studies of Effects of DVI Variability* (DOT HS 811 470b). Washington, DC: National Traffic Safety Administration.

<sup>57</sup> Robinson, E., et al. (2011). *Crash Warning Interface Metrics: Task 3 Report Appendices* (DOT HS 811 470c). Washington, DC: National Traffic Safety Administration.

<sup>58</sup> Forkenbrock, G., et al. (2011). *A Test Track Protocol for Assessing Forward Collision Warning Driver-Vehicle Interface Effectiveness* (DOT HS 811 501). Washington, DC: National Traffic Safety Administration.

<sup>59</sup> NHTSA. (2012). *Blueprint for Ending Distracted Driving* (DOT HS 811 629). Available at: <http://www.distraction.gov/downloads/pdfs/blueprint-for-ending-distracted-driving.pdf> (last accessed on 10/4/16).



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long-term goal of eliminating a specific category of crashes—those attributable to driver distraction.”

Industry and safety advocacy groups have also been working to eliminate driver distraction using education and public awareness campaigns, as well as through design guidance for built-in systems and other aftermarket solutions. The following sections highlight the efforts by NHTSA and the US DOT in legislative and enforcement approaches, education and public awareness approaches, and device-based solutions (e.g., guidelines or products), as well as similar efforts by industry and safety advocates

#### **G. Efforts by States to Address Distracted Driving Involving the Use of Portable Devices**

Most states, with the support of NHTSA and the US DOT, have passed laws to limit the use of portable devices while driving. Currently, 46 states, D.C., Puerto Rico, Guam, and the U.S. Virgin Islands ban texting while driving for drivers of all ages. Fourteen states, D.C., Puerto Rico, Guam, and the U.S. Virgin Islands ban drivers of all ages from using hand-held cell phones while driving.

In 2012, NHTSA partnered with the State of California and the State of Delaware to initiate a high-visibility enforcement (increased police presence supported by paid and earned media) demonstration program in the Sacramento area of California and in the State of Delaware in support of laws banning the use of hand-held cell phones while driving. Three waves of enforcement were conducted between October 2012 and June 2013. The featured tagline for the public face of the program was “*Phone in one Hand, Ticket in the Other.*” During the study period, a small percentage of crashes were coded as distraction-related, but the crash data analyses did not reveal any apparent effect of the high-visibility enforcement on the incidence of

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distraction-related crashes. Driver surveys, however, showed an increase in awareness that cell phone laws were being enforced. Observed hand-held driver cell phone use dropped by one-third from 4.1 percent to 2.7 percent in California (a 34% reduction); and from 4.5 percent to 3.0 percent in Delaware (a 33% reduction). The study concluded that high-visibility enforcement can be implemented over wide-spread, multi-jurisdictional areas and reduce the number of people who use a hand-held cell phone while driving.<sup>60</sup>

## **H. Education and Public Awareness Efforts**

### **1. Government Programs and Efforts**

The US DOT and NHTSA have put considerable effort toward reaching out to the community and the various stakeholders since the emergence of distracted driving as a traffic safety concern. The US DOT and NHTSA conducted two national summits, one in 2009 and one in 2011, to bring attention to the issue.

Following these distraction summits, NHTSA has held several meetings with stakeholders such as representatives of the automotive and communications industries as well as researchers and other key leaders to continue the public policy discussion on the distracted driving issue. For the public, NHTSA has created a website, [www.distraction.gov](http://www.distraction.gov), to provide timely information on distracted driving and current information on related research and development activities.

NHTSA has had, and continues to use, public service messages to change the attitudes and behaviors of drivers through social norming and enforcement messages. Social norming messaging is designed to appeal to the individual to change their behavior because it is the

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<sup>60</sup> Chaudhary, N. K., Connolly, J., Tison, J., Solomon, M., & Elliott, K. (2015). *Evaluation of the NHTSA distracted driving high-visibility enforcement demonstration projects in California and Delaware*. (DOT HS 812 108). Washington, DC: National Highway Traffic Safety Administration.

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socially acceptable thing to do without an underlying theme related to deterrence (e.g. “One text or call could wreck it all”). The enforcement messages were designed to be used in conjunction with high visibility enforcement programs to promote compliance with distracted driving laws or face the possible of an enforcement encounter (e.g. “U Drive U Text U Pay.”) Several messages in each category have been used since the inception of the distracted driving prevention effort.

NHTSA has also made efforts to reach out into the community on the issue of distracted driving through social media (e.g. “Twitter parties”) and blogs. There have also been a number of webinars for stakeholders and the public to familiarize them with recent developments in the effort to understand and reduce distractive driving behavior.

On February 6, 2014, the Senate Committee on Commerce, Science, and Transportation, led by Senator Jay Rockefeller (West Virginia), held a summit that focused on addressing potential technological solutions for minimizing driver distraction. The summit consisted of three roundtable sessions: 1) The State of Distracted Driving, 2) The State of Technology, and 3) Where do we go from there? Participants in all three of these roundtables consisted of Federal agencies, safety advocacy groups, industry associations, and companies from the automobile, consumer electronics, technology, and communications industries. The summit facilitated a dialogue between the various organizations, encouraging all participants to continue working together technologically to reduce the negative impacts of driver distraction.

## **2. Industry Programs and Efforts**

A range of industry stakeholders have also put forth an effort to educate drivers on the dangers of distracted driving. While there are too many education and public service announcement campaigns from industry and information outlets to list in this notice, two recent efforts by the wireless industry are included as examples (see [www.distraction.gov](http://www.distraction.gov) for a larger

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set of examples). As early as 1999, the wireless industry expended considerable effort to promote driver education about distracted driving. Most recently, the wireless industry partnered with the National Safety Council for the “On the Road, Off the Phone” campaign, which was directed at parents and younger drivers and focused on the dangers of texting while driving. In another campaign, AT&T began the “It Can Wait” education and awareness initiative recently, and garnered partnerships with several wireless carriers including Verizon Wireless, Sprint, and T-Mobile, as well as an endorsement from the CTIA-The Wireless Association.

## **I. Design Guideline Efforts**

### **1. NHTSA’s Phase 1 Visual-Manual Driver Distraction Guidelines**

As part of NHTSA’s efforts to reduce driver workload associated with performing tasks using devices within the vehicle (original equipment, aftermarket, and portable in-vehicle electronic devices) the agency has been developing Driver Distraction Guidelines for these devices. NHTSA issued its first phase of driver distraction guidelines on April 26, 2013, after notice and comment.<sup>61</sup> NHTSA’s Phase 1 Visual-Manual Driver Distraction Guidelines cover OE in-vehicle electronic devices that are operated by the driver through visual-manual means (i.e., the driver looks at a device, manipulates a device-related control with his or her hand, and/or watches for visual feedback from the device). The Phase 1 Guidelines cover any OE electronic device that the driver can easily see and/or reach, even if intended for use solely by passengers. However, the Phase 1 Guidelines do not cover any device that is located fully behind the front seat of the vehicle or any front-seat device that cannot readily be reached or seen by the driver.

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<sup>61</sup> 78 FR 24817 (Apr. 26, 2013).

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To facilitate the development of these guidelines, NHTSA studied existing guidelines relating to driver distraction prevention and reduction and found the “Statement of Principles, Criteria and Verification Procedures on Driver-Interactions with Advanced In-Vehicle Information and Communication Systems” developed by the Alliance of Automobile Manufacturers (Alliance Guidelines) to be the most complete and up-to-date. The Alliance Guidelines provided valuable input in NHTSA’s efforts to address driver distraction issues. Although NHTSA drew heavily on that input in developing the Phase 1 Guidelines, the agency identified a number of aspects that could be improved upon in order to further enhance driving safety, enhance guideline usability, improve implementation consistency, and incorporate the latest driver distraction research findings.

The Phase 1 Guidelines are based upon a number of fundamental principles. These principles include that:

- The driver’s eyes should usually be looking at the road ahead;
- The driver should be able to keep at least one hand on the steering wheel while performing a secondary task (both driving-related and non-driving related);
- The distraction induced by any secondary task performed while driving should not exceed that associated with a baseline reference task (manual radio tuning);
- Any task performed by a driver should be interruptible at any time;
- The driver, not the system/device, should control the pace of task interactions; and
- Displays should be easy for the driver to see and content presented should be easily discernible.

The Phase 1 Guidelines list certain activities that inherently interfere with a driver’s ability to safely control the vehicle, and the Guidelines recommend that in-vehicle devices be

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designed so that they cannot be used by the driver to perform these inherently distracting activities while driving (referred to as “per se lock outs”). The basis for these lock outs includes activities that are discouraged by public policy and, in some instances, prohibited by Federal regulation and/or State law (e.g., entering or displaying text messages). They also include activities identified in industry driver distraction guidelines, which NHTSA agrees are likely to distract drivers significantly (e.g., displaying video or automatically scrolling text). Finally, the lock outs include activities that are extremely likely to be distracting due to their very purpose of attracting visual attention, but whose obvious potential for distraction cannot be measured using a task timing system because the activity could continue indefinitely (displaying video or certain images). The specific per se lock outs are as follows:

- Displaying video not related to driving;
- Displaying certain graphical or photographic images;
- Displaying automatically scrolling text;
- Manual text entry for the purpose of text-based messaging, other communication, or internet browsing; and
- Displaying text for reading from books, periodical publications, web page content, social media content, text-based advertising and marketing, or text-based messages.

The per se lock out recommendations are not intended to prevent the display of images related to driving such as simple, two-dimensional map displays for the purpose of navigation, which would conform to these Guidelines, as long as they are displayed in a safe manner. These recommendations are also not intended to prevent the display of internationally standardized symbols and icons, Trademark™ and Registered® symbols (such as company logos), or images

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intended to aid a driver in making a selection in the context of a non-driving-related task, provided that the images extinguish automatically upon completion of the task.

For all other visual-manual secondary tasks, the Phase 1 Guidelines specify two alternative test methods for measuring the impact of performing a task on driving safety, as well as time-based acceptance criteria for assessing whether a task interferes too much with driver attention. It should be noted that *secondary task* is a broad term that captures any interaction the driver has with an in-vehicle device that is not directly related to the safe operation and control of a vehicle, and thus captures all non-driving-related tasks as well as driving-related tasks that aid the driving task but not the safe operation or control of the vehicle. If a visual-manual secondary task does not meet the acceptance criteria, the Phase 1 Guidelines recommend that OE in-vehicle devices be designed so that the task cannot be performed by the driver while driving. Both of these test methods focus on the amount of visual attention necessary to complete a task. Eye-glance-based criteria were selected because the research on visual-manual distraction establishes a link between visual attention (eyes off the road) and crash risk.

The first recommended test method measures the amount of time that the driver's eyes are drawn away from the forward roadway while performing a task. The Phase 1 Guidelines recommend that devices be designed so that tasks can be completed by the driver while driving with individual glances away from the roadway of 2 seconds or less and a cumulative time spent looking away from the roadway of 12 seconds or less. The second test method uses a visual occlusion technique and involves participants performing a task using occlusion goggles that alternatively open and shut every 1.5 seconds. The Phase 1 Guidelines recommend that devices be designed so that tasks can be completed with a cumulative shutter open time of 12 seconds or less.

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In addition to identifying inherently distracting tasks and providing a means to measure and evaluate the level of distraction associated with other secondary tasks, the Phase 1 Guidelines contain other recommendations for in-vehicle devices designed to limit and reduce their potential for distraction. Examples include a recommendation that performance of visual-manual tasks should not require the use of more than one hand, a recommendation that each device's active display be located as close as practicable to the driver's forward line of sight, and a recommended maximum downward viewing angle to the geometric center of each display.

In the notice announcing the Phase 1 Guidelines, the agency clarified that because the Guidelines were voluntary and non-binding, NHTSA's normal enforcement procedures related to Federal Motor Vehicle Safety Standard (FMVSS) compliance were not applicable. However, NHTSA indicated that as part of its ongoing distraction research activities, the agency does intend to monitor manufacturers' voluntary adoption of the Phase 1 Guidelines.

## **2. Efforts by Industry to Address Driver Distraction from Portable Devices**

Various efforts focused on portable and aftermarket devices have been initiated by industry to address driver distraction. In July 2013, the Consumer Technology Association (CTA), an association comprised of 2,000 companies within the consumer technology industry, initiated a Working Group focused on addressing portable and aftermarket electronic devices used by drivers in vehicles (formally named R6 WG18 Driver-Device Interface Working Group). Through mid-2014, the group had the goal of developing industry-based guidelines for portable device design that would address driver distraction. As indicated in a letter to the agency, the group had planned to use the NHTSA Phase 1 Guidelines as a starting point. The focus of this group had been to create a set of recommended practices by bringing together industry stakeholders and soliciting their technical input and expertise. These voluntary, industry-based



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recommended practices were intended to be used by portable electronic device manufacturers, software developers, and any other interested parties to improve the safety of driving and non-driving-related task performance. In mid-2014, the Working Group abandoned its work to develop industry-based guidelines due to liability concerns, instead modifying its overall objective to produce a technical report that categorizes “products and services offered by the consumer electronics (CE) industry that help make the driving experience safer.”<sup>62</sup> CTA’s technical report surveying the existing driver mode technologies was released in January 2015.<sup>63</sup> NHTSA has been participating in CTA’s working group as a non-voting liaison since its inception. NHTSA has provided explanations and rationale for aspects of NHTSA’s Phase 1 Visual-Manual Driver Distraction Guidelines, and participated in discussions regarding the application of the guideline’s basic principles to the complex, multipart ecosystem of portable and aftermarket electronic devices.

There have also been efforts within the standardization sector of the International Telecommunications Union (ITU-T)<sup>64</sup> to establish international consensus-based distraction standards for Information and Communications Technologies (ICTs). The ITU-T effort was intended to establish interoperability standards that enable the vehicle to safely manage driver interaction with ICT applications and services, regardless of if they are downloaded to a vehicle

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<sup>62</sup> Consumer Electronics (2014) CEA Cataloguing Driver Safety Products and Services [Press release]. Retrieved from <http://www.ce.org/News/News-Releases/Press-Releases/2014/CEA-Cataloguing-Driver-Safety-Products-and-Service.aspx?feed=Technology-Standards-Press-Releases> (last accessed on 10/4/16).

<sup>63</sup> Consumer Electronics (2015). Keeping Your Eyes on the Road: What the CE Industry is Doing to Help You Drive Safely. CEA-TR-6. Available for purchase at [http://www.techstreet.com/standards/cta-tr-6?product\\_id=1888242](http://www.techstreet.com/standards/cta-tr-6?product_id=1888242) (last accessed on 10/4/16).

<sup>64</sup> The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications, information and communication technologies (ICTs). The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

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or reside in a roadside station, portable device, cloud-based server, etc. These interoperability standards define functional mechanisms, data formats, and communications protocols. The proposed ITU-T “User Interface Requirements for Automotive Applications” (P.UIA Recommendation) would provide design guidance for user interfaces, as well as recommended test procedures and performance thresholds. As it stands, the published P.UIA Recommendation only proposes a structure for the guidance. The ITU-T’s efforts were concluded in 2013 with the publication of several reports.<sup>65</sup>

NHTSA is also participating as a liaison for a task group formed by the Car Connectivity Consortium (CCC), the developers of Mirror Link, to discuss the technical issues of device pairing, integration, testing, and certification. Mirror Link represents a major industry effort to enable and promote device pairing in vehicles. This effort began in November 2014.

In addition to these formal industry efforts to produce best practices, guidelines, and recommendations, several companies and groups have demonstrated various technical solutions for aspects of the distracted driving problem to NHTSA. These solutions include a driver mode for portable devices, anti-texting software applications that provide the capability to lock out the portable device screen, and driver distinction technologies that are both vehicle- and portable-device based. Each of these topics was included in NHTSA’s Phase 2 Public Meeting in March 2014.

### **3. Public Meeting on the Phase 2 Distraction Guidelines**

On March 12, 2014, NHTSA hosted a public meeting to bring together vehicle manufacturers and suppliers, portable and aftermarket device manufacturers, portable and

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<sup>65</sup> See the ITU-T’s website for the Focus Group on Distraction, which includes all reports that resulted from this effort. Available at <http://www.itu.int/en/ITU-T/focusgroups/distraction/Pages/default.aspx> (last accessed on 10/4/16).

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aftermarket device operating system providers, cellular service providers, industry associations, application developers, researchers, and consumer groups to discuss technical issues regarding the agency's development of Phase 2 Driver Distraction Guidelines for portable and aftermarket devices. The transcript for the public meeting and webcast video can be found in the docket for today's proposed guidelines,<sup>66</sup> along with copies of all presentations and spoken remarks.

In the public meeting, NHTSA presented an overview of the Phase 1 Driver Distraction Guidelines and the key technical issues in Phase 2. CTA presented a summary of its efforts to develop industry-based best practices for portable and aftermarket devices that could be used by drivers inside the vehicle. Following these presentations, there were three panels of invited experts who addressed the following technical topics: (1) vehicle and portable/aftermarket device pairing, (2) Driver Mode and advanced technologies, and (3) technologies that automatically distinguish between devices used by drivers and passengers.

In its presentation about the Distraction Guidelines, NHTSA highlighted the guiding principles for the guidelines along with the technical approaches to Phases 1 and 2. NHTSA emphasized pairing between the vehicle and portable devices as a means for incorporating portable and aftermarket devices under the Phase 1 Distraction Guidelines. NHTSA also discussed Driver Mode as an approach for unpaired portable devices. NHTSA encouraged the development of technology that can distinguish driver portable device use from passenger portable device use. NHTSA noted that similar test procedures and acceptance thresholds from Phase 1 would be applied to Phase 2. Other issues under consideration for the Phase 2 Distraction Guidelines included applicability to head-up displays and wearable devices, any

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<sup>66</sup> Docket No. NHTSA-2013-0137, "Driver Distraction Guidelines (Phase 2) for Portable and After-Market Devices Public Meeting Agenda and Presentations" ID: NHTSA-2013-0137-0004. Available at <http://www.regulations.gov/#!docketDetail;D=NHTSA-2013-0137> (last accessed on 10/4/16).

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additional per se lock outs that might be required for portable and aftermarket devices, placement of the portable device for testing, and continuous display information that does not meet the Phase 1 task definition. NHTSA concluded its presentation by highlighting the general process for publishing the Phase 2 Distraction Guidelines.

Following NHTSA's presentation, CTA gave a presentation on its Driver-Device Interface Working Group and activities for generating industry-based best practices. In its presentation at the public meeting, CTA noted that it believes best practices developed by industry collaboration have the greatest chance of success in the marketplace. Additionally, CTA recommended pairing. As of mid-2014, the Working Group modified its objective, choosing to develop a technology inventory instead of guidelines or recommendations.

The pairing panel consisted of presentations by General Motors, Toyota, Delphi, and the Car Connectivity Consortium. The Driver Mode and Advanced Technologies panel consisted of presentations by AT&T, Garmin, and Pioneer. The Driver-Passenger Distinction panel consisted of presentations by Cellcontrol, Cellepathy, and Lakeland Ventures Development-Takata. NHTSA conducted a period of questions and answers from the panelists after the presentations. NHTSA received additional comments from Consumers Union, Origo, and Vesstech that were read from the floor. Each of these presentations and spoken remarks can be found in the Phase 2 docket.<sup>67</sup>

**Comments:** In response to the public meeting, eight comments were posted to the docket by the Alliance of Automobile Manufacturers (Alliance), Blackberry Limited, CTIA—The Wireless Association, General Motors, Life Apps, the National Safety Council, Vesstech, and

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<sup>67</sup> Docket No. NHTSA-2013-0137, "Driver Distraction Guidelines (Phase 2) for Portable and After-Market Devices Public Meeting Agenda and Presentations" ID: NHTSA-2013-0137-0004. Available at <http://www.regulations.gov/#!docketDetail;D=NHTSA-2013-0137> (last accessed on 10/4/16).

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Consumers Union. Seven of the eight commenters supported NHTSA's Phase 2 Distraction Guidelines, with only CTIA recommending that solutions to portable device-based driver distraction be left solely to industry collaborations. CTIA also challenged NHTSA's authority to issue regulations, or even voluntary guidelines, for portable devices. The Alliance and General Motors urged NHTSA to complete Phase 2 as soon as possible, and the Alliance suggested NHTSA combine Phases 1 and 2 into a single set of NHTSA Distraction Guidelines. The National Safety Council requested NHTSA reconsider the three-phase approach to the distraction guidelines and to consider the full body of driver distraction literature rather than focusing solely on visual-manual distraction. Specifically, the National Safety Council urged NHTSA to include cognitive distraction issues in Phase 2 along with the visual-manual that were the focus of the Phase 1 Distraction Guidelines. CTIA commented that translating the Phase 1 Distraction Guidelines to portable devices is infeasible, partly due to the complex ecosystem surrounding portable devices, and that education and legislative approaches to the distraction problem should be the government's focus.

The Alliance, Blackberry Limited, General Motors, and Consumers Union all supported NHTSA's emphasis on paired solutions. The Alliance reiterated findings from research that quantified the extent to which consumers are "connected" in their daily lives, including while driving. The Alliance highlighted this research, which was posted to the Phase 1 Docket, as additional support for pairing or tethering solutions. The Alliance also highlighted that some of its members were already working towards pairing solutions, and that the Car Connectivity Consortium was a formal industry organization working towards that end. General Motors mentioned its own efforts towards paired solutions. Blackberry Limited urged NHTSA to consider the ITU-T draft set of industry-generated recommendations for information and

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communications technologies. Consumers Union described its findings on various existing pairing solutions, and specifically how easy or user-friendly the pairing process was for drivers. Blackberry Limited offered several specific suggestions for NHTSA to consider about pairing solutions and Driver Mode.

The response to Driver Mode solution was mixed, with the Alliance stating that the only acceptable Driver Mode was the portable device in the “off” setting, and that Driver Mode “apps” that drivers must choose to engage are not realistic solutions. Blackberry Limited, Consumers Union, and Life Apps provided specific recommendations or support for Driver Mode implementations. Blackberry Limited had specific suggestions regarding pairing and Driver Mode, and urged NHTSA to not recommend less stringent guidelines for Driver Mode, but also not to include specific technological approaches (i.e., the specific wireless communication protocol between the portable device and the vehicle) in the Phase 2 Distraction Guidelines. CTIA also noted the fact that several driver mode “apps,” or applications that otherwise limit portable device functionality while driving, are currently available is evidence that industry is working towards solutions to the distraction problem with portable devices, and therefore NHTSA’s guidelines are unnecessary.

The Alliance supported NHTSA’s inclusion of driver-passenger distinction technology and urged NHTSA to establish a cooperative research program with industry to foster technological development in this area.

Some commenters in the public meeting had specific implementation suggestions for portable device-use while driving. For example, the National Safety Council suggested NHTSA require portable devices have an option to quickly turn the portable device off while driving. Life Apps highlighted an approach that uses the portable device only, which does not require

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hardware components to detect that the driver is using the device when driving. Vesstech argued for a solution that included mandatory vocal warnings to be automatically spoken to drivers. It suggested that the emotional content relayed by the human voice would be an effective deterrent that would discourage portable device use while driving. CTIA argued that education, legislation, and technical innovation are the best ways to address distraction from portable devices, and listed the ways in which they have been active in each area.

**Agency Response:** NHTSA is considering combining Phase 1 and 2 Guidelines, to the extent practicable. As discussed previously, we seek comment on the combination of the Phase 1 and 2 Guidelines. A statement of NHTSA's authority to issue voluntary, non-binding guidance is included in Section V of this notice.

NHTSA provided a detailed explanation and rationale for the focus on visual-manual distraction in the Phase 1 Guidelines,<sup>68</sup> which addresses the National Safety Council's suggestion that NHTSA include the full-range of distraction and associated research literature, namely cognitive distraction. NHTSA recognizes the importance of experimental research findings, such as those using driving simulators, that show decreased driving performance for distractions of all types. Both naturalistic driving studies (such as NHTSA's 2013 cell phone naturalistic driving study<sup>69</sup>) and experimental studies consistently show that visual-manual distraction contributes to degraded driving performance and a significantly elevated crash risk. While the full body of research data is less conclusive with respect to cognitive distraction, the agency continues to be actively engaged in reviewing the latest research findings. In May 2015,

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<sup>68</sup> 78 FR 24817 (Apr. 26, 2013), pp. 24836-24838.

<sup>69</sup> Fitch, G., et al. (2013). *The Impact of Hand-Held and Hands-Free Cell Phone Use on Driving Performance and Safety-Critical Event Risk* (DOT HS 811 757). Washington, DC: National Highway Traffic Safety Administration.

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NHTSA hosted an event called “Cognitive Distraction: What Were You Thinking?”<sup>70</sup> that brought members of the international research community and safety advocates together to discuss what cognitive distraction is, how to measure it, and what to do about it. NHTSA is also currently conducting a significant amount of research related to auditory-vocal (i.e., voice-based) system interfaces, as well as a study to explore ways of measuring internal cognitive distraction (e.g., mind wandering) while driving.

NHTSA has reviewed each of the detailed recommendations from the various commenters on both pairing and driver mode. Some of those recommendations are consistent with NHTSA’s goal of remaining neutral regarding specific technological approaches to pairing and to Driver Mode activation, and therefore are reflected in these proposed Phase 2 Guidelines. At NHTSA’s public meeting, participants on the Driver-Passenger Distinction panel presented different technological approaches to identifying which vehicle occupant is using a portable device. Most approaches use a combination of hardware and software installed in the vehicle and on the portable device to determine whether the device user is a driver or passenger.

One approach involved a piece of hardware that creates zones within a vehicle by emitting signals. The driver’s seating position would have a different signal that could be identified by software and/or hardware on a portable device. Identifying the driver’s position with this method would potentially allow the device to activate the driver mode only for the driver while he or she is driving. This signal could vary depending on the transmission state.

Another driver-passenger distinction technology uses capacitive sensors within the seats that allow the vehicle to detect where portable devices are being used within a vehicle. These

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<sup>70</sup> Presentations and video recording of the event can be found at the NHTSA website: <http://www.nhtsa.gov/nhtsa/symposiums/may2015/index.html> (last accessed on 10/4/16).



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sensors are able to determine if each occupant is holding and using a portable device by utilizing the conductivity of the human body. By detecting if a driver is using a portable device, the vehicle can tell the portable device to activate the driver mode. Driver Mode can be activated depending on the state of the vehicle's transmission (i.e., park vs. drive).

Finally, a device-only solution uses an authentication task approach where a device automatically goes into a limited use state (e.g., Driver Mode) at a speed threshold, and a quick, but challenging task is required to re-enable full functionality on the device. These authentication tasks are designed to be quick and easy for non-drivers, but nearly impossible to complete successfully within the short time limit for drivers.

NHTSA recognizes that there may be other concepts to achieve driver-passenger distinction that were not presented in the Public Meeting, but those presented provide an example of how this capability can be achieved technologically. Accordingly, NHTSA continues to monitor the development and progress of driver-passenger distinction technologies, and seeks input on how to foster the refinement of that technology to enhance reliable and automatic Driver Mode solutions for unpaired portable devices. For example, the Alliance recommended establishing a cooperative research program. The agency seeks comments from all stakeholders on what specific research needs remain to progress driver-passenger distinction technology to full maturity.

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All presentations and comments from the NHTSA Phase 2 Public Meeting are available for download in the Phase 2 docket,<sup>71</sup> along with the transcript of the meeting and a link to the recorded webcast of the meeting.

### **III. Distraction Guidelines for Portable and Aftermarket Devices**

#### **A. Scope**

##### **1. Devices/Device Interfaces**

The proposed Phase 2 Guidelines would apply to the visual-manual interfaces of portable and aftermarket devices that may be used by a driver. A “portable device” is defined as a device that can reasonably be expected to be brought into a vehicle on a trip-by-trip basis and used in the vehicle by a driver while driving, that is electrically powered, and that has one or more of the following capabilities:

- Allows user interaction
- Enters, sends, and/or receives information
- Displays information in a visual and/or auditory manner, or
- Displays graphical, photographic, and/or video images

The agency has tentatively concluded that this definition sets out the appropriate scope for the types of device interfaces that should be covered by the Phase 2 Guidelines, i.e., the interfaces of portable electronic devices that are likely to be used by drivers when driving. Examples of portable devices covered by the proposed Phase 2 Guidelines are smartphones, tablets, and navigation devices. The recommendations to manufacturers in these guidelines are

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<sup>71</sup> Docket No. NHTSA-2013-0137, “Driver Distraction Guidelines (Phase 2) for Portable and After-Market Devices Public Meeting Agenda and Presentations” ID: NHTSA-2013-0137-0004. Available at <http://www.regulations.gov/#!docketDetail;D=NHTSA-2013-0137> (last accessed on 10/4/16).

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intended to focus on devices used by drivers while driving. NHTSA seeks comment on whether clarification/revisions to the provisions in this guidance document are necessary to ensure that passengers/non-drivers are not inadvertently impacted by this guidance document. In other words, NHTSA seeks to ensure that passengers (including front passengers) are able to use their devices and applications without disruption.

Additionally, this definition would include some of the new portable technology that is beginning to appear, such as wearable technology (electronic devices with interfaces that are worn on and move with the body) and certain non-OE, head-up displays (HUDs).<sup>72</sup> Wearable technology includes wristwatch computers and optical head-mounted displays (OHMD). Although OHMD and HUD interfaces are classified as portable or aftermarket devices and would therefore be covered by the Phase 2 Guidelines, the agency notes that there are issues with applying the Phase 1 glance-based metrics to measure the level of visual distraction associated with the use of these devices. The most significant issue with applying Phase 1 acceptance tests to OHMD and HUD is that the performance criteria for measuring distraction is eyes-off-road time and the information from these technologies is displayed either directly in front of the driver's eyes (OHMD) or on the windshield in front of the driver (HUD). While the driver may appear to be looking toward the forward roadway, the driver's eyes would actually be focused at a different focal distance that corresponds to the displayed OHMD/HUD information. This means that in testing it may not be possible to reliably discern whether the driver's eyes are focused on the roadway or the information displayed on the OHMD/HUD, which confounds the ability to evaluate eye glance behavior to the task acceptance criteria. The agency is concerned

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<sup>72</sup> HUDs for motor vehicles project information onto the windshield in front of the driver.

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that although these devices might tend to keep the eyes oriented toward the forward roadway, the presentation of information in front of the driver may still result in visual distraction causing the eyes to be focused on the displayed information rather than on the road (e.g., visual accommodation changes to view the presented information could result in the driver's view of the forward roadway being out of focus). Accordingly, the agency has begun research on these devices to determine whether their use impacts vehicle safety and, if so, what visual attention metrics might be used to explain the effects.

Finally, NHTSA recognizes that many of these new portable devices are released as pre-production versions, thereby allowing the market to update, refine, and shape the maturation of the technology. NHTSA seeks comment on portable device product cycles along with software updating processes to better understand the evolving stakeholder landscape.

For the purposes of this Phase 2 proposal, an “aftermarket device” is defined as a device designed to be or reasonably expected to be installed or integrated into a vehicle after the vehicle is manufactured, is electrically powered, and has one or more of the following capabilities:

- Allows user interaction
- Enters, sends, and/or receives information
- Displays information in a visual and/or auditory manner, or
- Displays graphical images, photographic images, and/or video.

An example of an aftermarket device would be a non-OE head unit, such as in-dash car audio/video systems or in-dash navigation systems.

NHTSA requests comments on its proposed definitions in the proposed Phase 2 Guidelines.

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The proposed Phase 2 Guidelines exclude several devices/device interfaces, including the auditory-vocal portions of a portable or aftermarket device interface,<sup>73</sup> device or device functions specified by law or government regulation, or devices manufactured primarily for emergency response vehicles. These exclusions mirror those listed in the Phase 1 Guidelines for OE in-vehicle interfaces. However, in contrast to the Phase 1 Guidelines, NHTSA believes that the proposed Phase 2 Guidelines do not necessarily need to be restricted by vehicle weight and would apply to the interfaces of portable and aftermarket devices used in medium and heavy vehicles (i.e., those with a gross vehicle weight rating (GVWR) over 10,000 pounds). The Phase 1 Guidelines excluded OE in-vehicle interfaces in these vehicles because they are different than the interfaces in light vehicles (GVWR of 10,000 pounds or less) and additional research would be needed to develop guidelines for medium and heavy vehicles. In contrast, NHTSA does not believe that the same types of differences, if any, exist between portable and aftermarket devices used in light vehicles versus those used in heavy vehicles, and, therefore such an exclusion is not warranted for the Phase 2 Guidelines.

The agency also seeks comment on device interfaces that should or should not be covered by the proposed Phase 2 Guidelines.

## **2. Tasks**

The proposed Phase 2 Guidelines would be applicable to the same types of visual-manual secondary tasks covered by the Phase 1 Guidelines, including all non-driving-related tasks and some driving-related tasks (as noted earlier), specifically those that are neither related to the safe operation and control of the vehicle nor involve the use of a system required by law. Table 1 of

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<sup>73</sup> NHTSA recognizes that current auditory-vocal interfaces are multi-modal and include a combination of auditory-vocal and visual-manual interactions. All visual-manual interactions are subject to Phases 1 and 2 of the Distraction Guidelines.

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the updated Phase 1 Guidelines<sup>74</sup> published on September 14, 2014, contains a non-exhaustive list of the types of non-driving-related tasks to which the Guidelines would be applicable, including various communications, entertainment, and information tasks. This table is repeated in Table 7 below.

**Table 7. Non-Driving-Related Tasks/Devices to Which These Guidelines Apply**

<b>Type of Task</b>	<b>Task/Device</b>
Communications	Caller Identification Incoming Call Management Initiating and Terminating Phone Calls Conference Phoning Two-Way Radio Communications Paging Address Book Reminders Text-Based Communications Social Media Messaging or Posting
Entertainment	Radio (including but not limited to AM, FM, and Satellite) Pre-recorded Music Players, All Formats Television Video Displays Advertising Internet Browsing News Directory Services
Information	Clock Temperature

Like the Phase 1 Guidelines, the Phase 2 Guidelines would not apply to tasks performed by the driver as part of the safe operation and control of the vehicle, including any task related to the proper use of a driver safety warning system. Although the agency did not define the term

<sup>74</sup> Docket No. NHTSA-2014-0088. “Guidelines for Reducing Visual-Manual Driver Distraction during Interactions with Integrated, In-Vehicle, Electronic Devices Version 1.01” ID: NHTSA-2014-0088-0002. Available at <https://www.regulations.gov/document?D=NHTSA-2014-0088-0002> (last accessed on 10/4/16).

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driver safety warning system in the Phase 1 Guidelines, the agency is including a definition in the proposed Phase 2 Guidelines (that also shall apply to Phase 1) because of the wide variety of portable and aftermarket device applications that exist and the agency's concern that applications with a questionable link to safety might be labeled as driver safety warning systems.

Accordingly, the proposed Phase 2 Guidelines define "driver safety warning system" as "a system or application that is intended to assist the driver in the avoidance or mitigation of crashes." An example of a system that would fall within this definition is a portable device application that uses the device's features (e.g., GPS, accelerometer, or camera) to alert drivers of lane departures or potential collisions.

Finally, the Phase 2 Guidelines apply to tasks that are clearly bounded by start and end states as is discussed in the Phase 1 Guidelines (see section IV.B.9 on p. 24884). Displays that continuously report a system state like speed or fuel economy status are unbounded and are therefore not subject to the Phase 1 or 2 Guidelines.

## **B. Overview of the Phase 2 Guidelines**

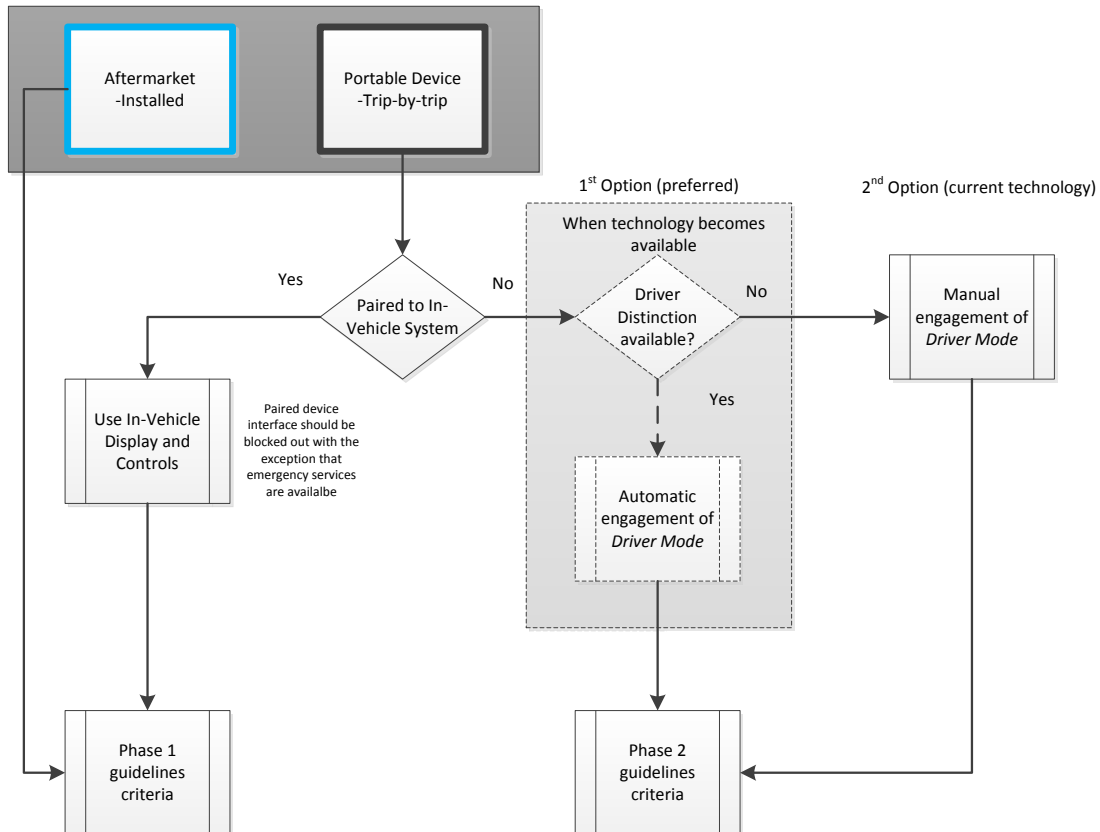
In order to address the vehicle safety problem posed by driver distraction due to aftermarket and portable device usage, NHTSA tentatively recommends the following in its Phase 2 Guidelines:

- Portable device manufacturers incorporate pairing capabilities and Driver Mode functions into their devices to reduce driver distraction.
- OEMs incorporate pairing capabilities into the design of their vehicles

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- Manufacturers of aftermarket devices meet the requirements as specified for OE interfaces in Phase 1.<sup>75</sup>

Figure 1 depicts how the Phase 2 Guidelines apply to both portable and aftermarket devices, including pairing and Driver Mode configurations.



**Figure 1. Flow diagram summarizing the overall recommendations for both portable and aftermarket devices.**

NHTSA recommends pairing a portable device with the in-vehicle system (i.e., OE or installed aftermarket systems) to minimize the potential distraction associated with operating a visual-manual interface on a portable device. Vehicle manufacturers and the portable device industry are already working together to incorporate pairing between devices and vehicles, and

<sup>75</sup> While the recommendation is that aftermarket devices meet the Phase 1 Guidelines, this recommendation will be made in the Phase 2 document. Therefore, aftermarket manufacturers would look to the Phase 2 guidelines for recommendations.



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the agency hopes that the Phase 2 Guidelines will accelerate those efforts.<sup>76</sup> Pairing the device to the vehicle would allow the driver to use the built-in displays and controls. Assuming that the vehicle conforms to the Phase 1 Guidelines, pairing would ensure that the visual-manual secondary tasks performed by the driver while driving meet the time-based, eye-glance task acceptance criteria specified in the Phase 1 Guidelines that is intended to mitigate the risk of distracted driving. Pairing would also ensure that certain activities that would inherently interfere with the driver's ability to safely control the vehicle would be locked out while driving (i.e., the "per se lock outs" referred to in the Phase 1 Guidelines and the proposed Phase 2 Guidelines).

Although NHTSA recommends that pairing a portable device with the in-vehicle interface is the best way to mitigate the distraction associated with operating a visual-manual portable device interface, the agency acknowledges that there will be situations when pairing does not occur, either because the in-vehicle system and/or portable device does not possess the capability for pairing or because the driver chooses not to pair with the in-vehicle system. In order to mitigate the additional distraction associated with the use of an unpaired portable device, the agency recommends that portable devices include a Driver Mode that, when activated, will present an interface that conforms with the Phase 1 Guidelines recommendations for electronic devices used by the driver while driving. In particular, when a portable device is in Driver Mode, the device should lock out tasks that are among the Phase 1 Guidelines per se lock outs or do not meet Phase 1 task acceptance criteria.

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<sup>76</sup> <http://www.engadget.com/2014/10/02/apple-carplay-comes-to-pioneer-stereos-as-spotify-adds-support/> (last accessed on 10/4/16).

<http://www.engadget.com/2014/10/03/hondas-in-car-connect-system-does-android-its-own-way-hands-on/> (last accessed on 10/4/16).

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NHTSA seeks comment on this approach and whether additional per se lock outs are appropriate for portable and aftermarket devices, whether paired with the in-vehicle system or in Driver Mode.

NHTSA acknowledges that some devices, such as standalone portable navigation devices, are designed for, and exist primarily for use in a single context (e.g. navigation in a motor vehicle). These devices are useful because they package both the hardware and a user interface in one compact portable unit. For such a device designed primarily for use while driving, pairing the device with the vehicle would not provide any benefit since its native interface should meet the Driver Mode recommendations and pairing is not required. For this reason, portable navigation devices that do not have pairing capability would not be expected to have a separate Driver Mode. NHTSA requests comments on whether the assumptions for this recommendation are reasonable and appropriate.

## **C. Pairing**

### **1. Pairing Recommendations**

The proposed Phase 2 Guidelines recommend that vehicle manufacturers and portable device manufacturers should provide the necessary mechanisms to easily enable pairing between the portable device and the vehicle/in-vehicle system.<sup>77</sup> In order to reduce the potential for distraction associated with pairing while also encouraging drivers to pair their devices, pairing should be an easy-to-understand task that allows the driver to set up the portable device to communicate with the in-vehicle system in the fewest number of steps possible, even automatically if feasible. If a portable device and vehicle pair easily, it is less likely that a user

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<sup>77</sup> For purposes of this discussion, “in-vehicle system” includes both OE and aftermarket headunits installed in a motor vehicle.

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will become discouraged and not attempt to pair a device with a vehicle. NHTSA encourages all entities involved with the engineering and design of pairing technologies to jointly develop compatible and efficient processes that focus on improving the usability of connecting a portable device with the in-vehicle system. The proposed Guidelines further recommend that any required visual-manual interactions necessary to pair the device should be disabled while driving in order to avoid potential driver distraction. The agency encourages automatic pairing between the portable device and in-vehicle system during and after the initial setup.

In order to ensure that a paired portable device's functions are operated through the in-vehicle interface, which is intended and designed specifically for the driving environment, the proposed Phase 2 Guidelines recommend that the visual interface of the portable device be locked out when the portable device is paired to the in-vehicle system, with the exception of access to emergency services and emergency notifications. All non-emergency functions and applications of the portable device should be operable exclusively through the in-vehicle system's interface. A paired system with a compelling user experience and features should discourage the need for the driver to access or interact with the portable device while driving. NHTSA seeks comment on displaying and operating all non-emergency paired device functions through the in-vehicle interface and whether doing so creates unintended consequences. NHTSA also seeks comment on how best to accommodate passenger use of a paired portable device.

## **2. Privacy and Data Sharing for Paired Devices**

The primary purpose of this document is to address driver distraction and vehicle safety. However, NHTSA acknowledges that the pairing recommendations may touch on potential privacy concerns regarding the possibility of data transfer, sharing, and storage between the vehicle, device, and off-board systems. The proposed Guidelines do not recommend any

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particular method of pairing or specify how automakers and the portable and aftermarket device industries should address how information is shared and used. The agency encourages industry to consider how privacy risks can be minimized as part of the development and improvement of pairing systems.

Industry groups have begun to address the issue of privacy as the Alliance of Automobile Manufacturers and Global Automakers published a set of principles on November 12, 2014.<sup>78</sup>

In light of these potential issues, NHTSA seeks comment on how information is shared between the vehicle, device, and off-board systems when devices are paired with the vehicle, how the type of information that is shared may change in the future, how this information sharing affects privacy, and what role the Guidelines can and should play in addressing these privacy issues.

### **3. Cybersecurity for Paired Devices**

Designing portable devices so that they can be paired with motor vehicles must be accompanied by appropriate cybersecurity measures. Unless such care is taken, adding another Internet-connected device to a vehicle's electronics system can introduce additional cybersecurity vulnerabilities into a vehicle's computer systems.

Safeguarding the traveling public through a combination of measures requiring and/or encouraging the incorporation of safety features and systems in motor vehicles and motor vehicle equipment as well as measures to protect the performance of those features and systems is part of NHTSA's core mission. Equally important is identifying motor vehicles or items of motor

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<sup>78</sup> Alliance of Automobile Manufacturers and Association of Global Automakers (2014). Consumer Privacy Protection Principles: Privacy Principles for Vehicle Technologies and Services. Retrieved from <http://www.autoalliance.org/index.cfm?objectid=CC629950-6A96-11E4-866D000C296BA163> (last accessed on 10/4/16).

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vehicle equipment that create an unreasonable risk of accidents occurring or unreasonable risk of death or injury occurring in an accident because of deficiencies in design, construction, or performance and requiring their recall and remedy.

These Guidelines do not suggest or recommend particular methods for creating and maintaining an effective level of cybersecurity in motor vehicles or in portable or aftermarket devices. NHTSA expects that OEMs, portable device manufacturers, and aftermarket manufacturers to be proactive and take the steps necessary to protect against present and future motor vehicle cybersecurity threats. We seek comment on the continuing steps that must be taken to ensure that pairing does not adversely affect vehicle cybersecurity.

#### **D. Driver Mode**

Ideally, a Driver Mode would not be necessary since NHTSA believes those functions related to the driving task should occur when the device is paired with an in-vehicle system that conforms with the Phase 1 Guidelines. However, our data confirms what everyday observation indicates: many drivers routinely use their portable device(s) while driving. The agency believes that over time as pairing becomes easier, increased device pairing may help reduce this behavior, but is unlikely to eliminate it, because not all vehicles will have been designed to allow pairing and drivers may not choose to pair their devices. The agency, therefore, believes it is necessary to propose guidelines that attempt to reduce the risk associated with using an unpaired portable device while driving. The agency believes that the proposed Driver Mode outlined below, which suggests that the device's interface follow the Phase 1 principles to the extent possible, is the best way to minimize the distraction posed by these devices.

##### **1. Driver Mode Recommendations**

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Driver Mode is a simplified interface for unpaired devices that conforms to the Phase 1 Guidelines when being used by a person who is driving. When in Driver Mode, the portable device should lock out any visual-manual secondary tasks that do not meet the Phase 1 Guidelines, either because they are per se lockouts or because they do not meet the eye-glance-based task acceptance criteria using a modified version of the Phase 1 task acceptance testing procedures described in Section V of the Phase 2 Guidelines.

The Phase 1 Guidelines specify two different test options for measuring the impact of performing a task on driving safety and acceptance criteria for assessing whether a task interferes enough with driver attention to be unsuitable for performance while driving. Either test may be run to assess conformance with the guidelines. Both of these test methods focus on the amount of visual attention necessary to complete a task because existing research on visual-manual distraction establishes a link between visual attention (eyes off the road) and crash risk.

The first recommended test method measures the amount of time that the driver's eyes are drawn away from the roadway during the performance of the task. The proposed Phase 2 Guidelines, like the Phase 1 Guidelines, recommend that devices be designed so that tasks can be completed by the driver while driving with glances away from the roadway of 2 seconds or less and a cumulative time spent glancing away from the roadway of 12 seconds or less. NHTSA anticipates that stakeholders (e.g., OS developers, portable device developers, and application developers) will work together to ensure that applications and features on portable devices intended for use while driving meet the Phase 2 Guidelines. NHTSA requests comments on how this industry process will develop and function.

The second test method uses a visual occlusion technique, and both the Phase 1 and proposed Phase 2 Guidelines recommend that, when tested with this method, devices be

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designed so that tasks can be completed in a series of 1.5-second glances with a cumulative time of not more than 12 seconds.<sup>79</sup> Both of these tests are part of the Phase 1 NHTSA Guidelines and the Alliance of Automobile Manufacturers (Alliance) guidelines.

Detailed discussions of how these thresholds were developed are contained in the proposed Phase 1 Guidelines notice<sup>80</sup> and the final Phase 1 Guidelines notice.<sup>81</sup> In summary, glances away from the forward road scene greater than 2 seconds at a time are associated with an increased risk of a crash or near crash. The total eyes off road time criterion is based on the principle that a visual-manual secondary task performed while driving should not exceed that associated with a baseline reference task (in this case, the manual tuning of a radio). NHTSA selected radio tuning as the reference task<sup>82</sup> and determined that the 85<sup>th</sup> percentile total eyes off road time (TEORT) associated with radio tuning is 12 seconds. Recent testing conducted by the agency to assess the proposed acceptance criteria for both the simulator and occlusion procedures supports the use of 2-second individual glance duration criterion and a 12-second TEORT criterion (i.e., a “2/12 Rule”).<sup>83</sup>

NHTSA has tentatively concluded that because the crash risk associated with distraction caused by vehicle OE interfaces and portable devices is borne out of similar visual-manual interaction between the driver and the device, the Phase 2 Guidelines should apply the Phase 1

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<sup>79</sup> As explained in detail in the Phase 1 Guidelines notices, the 1.5-second shutter open time periods used in the occlusion method correspond to 2 second off-road glances.

<sup>80</sup> 77 FR 11199 (Feb. 24, 2012).

<sup>81</sup> 78 FR 24817 (Apr. 26, 2013).

<sup>82</sup> The concept of a reference task and the use of radio tuning originated with the Alliance Guidelines, Driver Focus-Telematics Working Group, “Statement of Principles, Criteria and Verification Procedures on Driver-Interactions with Advanced In-Vehicle Information and Communication Systems,” June 26, 2006 version, Alliance of Automobile Manufacturers, Washington, DC

<sup>83</sup> Ranney, T., Baldwin, S., Smith, L., Martin, J., & Mazzae, E. (2013). *Driver Behavior During Visual-Manual Secondary Task Performance: Occlusion Method Versus Simulated Driving* (DOT HS 811 726). Washington, DC: National Highway Traffic Safety Administration.

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Guidelines to the proposed Driver Mode. In other words, because a driver would be diverting his or her attention away from the road to an area within reach and view of the driver compartment, a recommendation for a portable device in Driver Mode should be similar to that of in-vehicle systems.

In addition to the recommendations regarding per se lock outs and the task acceptance criteria, the proposed Phase 2 Guidelines recommend that when in Driver Mode, portable device interfaces conform to the following Phase 1 Guidelines recommendations:

- No Obstruction of View
- Easy to See and Reach
- Sound Level
- Single-Handed Operation
- Interruptibility
- Device Response Time
- Disablement
- Distinguish Tasks of Functions not intended for use while driving
- Device Status

Due to the differences between integrated OE interfaces and portable devices, the proposed Phase 2 Guidelines do not include the Phase 1 recommendations related to maximum downward viewing angle, lateral position of visual displays, and minimum size of displayed text information. These recommendations relate to the placement of the interface or the size of the interface text given that placement. Because the placement of a portable device in a vehicle is determined by the owner or driver of the vehicle rather than the device manufacturer or software



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designer, the agency has tentatively concluded that, as it cannot know for certain where, how, or if the device will be mounted, these recommendations are not appropriate for portable devices.

Despite this fact, the agency still believes it is necessary to propose a repeatable test that would allow the agency to determine what devices conform with the proposed Driver Mode. Such a test, even if it does not reflect how all drivers use portable devices in all circumstances, would, nevertheless, provide the agency with a benchmark to measure conformance across a wide variety of different devices. The agency proposes that manufacturers test unpaired portable devices, including those in Driver Mode, in a location within a vehicle that, to the greatest extent possible, conforms to the recommendations enumerated in Phase 1 (i.e. no obstruction of view, easy to see and reach) and do not result in the portable device interfering with airbag deployment zones or safe operation of the vehicle controls. The agency believes that this is a repeatable means to address Driver Mode conformance, which may be representative of how the device may be mounted in the vehicle by a driver. The agency acknowledges that some drivers may not mount their portable device and, instead use it while holding it in their hand. However, the agency does not believe it is possible or desirable to create a repeatable test based on in-hand use.

The agency requests comments on differences between vehicle OE interfaces and portable devices. Specifically, NHTSA would like to know what, if any testing methods, stakeholders currently use (or suggest using) to address the varying placements of a portable device inside an automobile.

The Phase 1 Guidelines per se lock outs include activities that are discouraged by public policy and, in some instances, prohibited by Federal regulation or State law (e.g., entering or displaying text messages), and activities identified in industry driver distraction guidelines that

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NHTSA agrees are likely to distract drivers significantly (e.g., automatically scrolling text). The per se lock outs also address activities that are extremely likely to be distracting due to their very purpose of attracting visual attention, but whose obvious potential for distraction cannot be measured using a task timing system because the activity could continue indefinitely (e.g., displaying video or certain images). Below is a detailed description of the per se lock outs taken from the Phase 1 Guidelines<sup>84</sup>:

- Device functions and tasks not intended to be used by a driver while driving.
- Manual Text Entry. Manual text entry by the driver for the purpose of text-based messaging, other communication, or internet browsing.
- Displaying Video. Displaying (or permitting the display of) video including, but not limited to, video-based entertainment and video-based communications including video phoning and videoconferencing.
  - Exceptions:<sup>85</sup>
    - Map displays. The visual presentation of dynamic map and/or location information in a two-dimensional format, with or without perspective, for the purpose of providing navigational information or driving directions when requested by the driver (assuming the presentation of this information conforms to all other recommendations of these Guidelines). However, the display of informational detail not critical

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<sup>84</sup> 78 FR 24817 (Apr. 26, 2013), available at <https://www.federalregister.gov/articles/2013/04/26/2013-09883/visual-manual-nhtsa-driver-distraction-guidelines-for-in-vehicle-electronic-devices> (last accessed on 10/4/16).

<sup>85</sup> Certain exceptions to the video per se lock out are not listed here because it is unlikely that a portable or aftermarket device's interface would include that type of functionality (e.g., rearview images used to aid the driver performing a maneuver in which the vehicle's transmission is in reverse gear). However, all of the display of video per se lock out exceptions listed in the Phase 1 Guidelines would also be applicable to portable and aftermarket devices.

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to navigation, such as photorealistic images, satellite images, or three-dimensional images is not recommended.

- Displaying Images. Displaying (or permitting the display of) non-video graphical or photographic images.
  - Exceptions:
    - Displaying driving-related images including maps (assuming the presentation of this information conforms to all other recommendations of these Guidelines). However, the display of map informational detail not critical to navigation, such as photorealistic images, satellite images, or three-dimensional images is not recommended.
    - Static graphical and photographic images displayed for the purpose of aiding a driver to efficiently make a selection in the context of a non-driving-related task (e.g., music) is acceptable if the image automatically extinguishes from the display upon completion of the task. If appropriate, these images may be presented along with short text descriptions that conform to these Guidelines.
    - Internationally standardized symbols and icons, as well as Trademark™ and Registered® symbols, are not considered static graphical or photographic images.
- Automatically Scrolling Text. The display of scrolling (either horizontally or vertically) text that is moving at a pace not controlled by the driver.

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- Displaying Text to Be Read. The visual presentation of the following types of non-driving-related task textual information:
  - Books
  - Periodical publications (including newspapers, magazines, articles)
  - Web page content
  - Social media content
  - Text-based advertising and marketing
  - Text-based messages (see definition) and correspondence
  - Exception:
    - The visual presentation of limited amounts of other types of text during a testable task is acceptable. The maximum amount of text that should be visually presented during a single testable task is determined by the eye-glance-based acceptance tests.

The agency requests comment on the applicability of the Phase 1 per se lock outs to portable devices. Are additional exceptions needed for certain portable device tasks? Are there additional portable device tasks that should be included in the per se lock outs if the device has a Phase 1 Guidelines-conforming Driver Mode interface?

## **2. Driver Mode Activation**

The Phase 2 Guidelines' proposed recommendations regarding the activation of the Driver Mode would differ significantly from the Phase 1 Guideline's recommendations in terms of when OE in-vehicle devices should lock out certain tasks and meet certain other device recommendations.

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In particular, the Phase 1 Guidelines recommend that OE in-vehicle devices should lock out certain tasks from performance by the driver while “driving.” “Driving” is defined as whenever a vehicle’s means of propulsion is activated unless the vehicle’s transmission is in the “Park” position or, for manual transmission vehicles, the vehicle’s transmission is in the “neutral” position, the parking brake is engaged, and the vehicle’s speed is less than 5 mph.

This definition was based on definitions used in various statutes, regulations, and Executive Orders related to distracted driving,<sup>86</sup> which defined driving as operating a vehicle on an active roadway with the motor running, including while temporarily stationary because of traffic, traffic control devices, etc. The agency was also concerned that limiting “driving” to when a vehicle is traveling above a certain speed could result in drivers performing distracting tasks at low speeds, creating an increased risk of a crash at signal- or sign-controlled intersections and in traffic. Accordingly, by using existing definitions as a foundation, the agency developed a definition that is based on information known to, or able to be detected by vehicle systems: transmission position, vehicle speed, and the status of the parking brake.

In analyzing how to apply the Phase 1 Guidelines to portable and aftermarket devices, the agency has determined activation of Driver Mode is dependent upon the technologies and features present, as well as the level of communication between a portable/aftermarket device and a vehicle. Based on these considerations, the agency has developed two alternative methods for activating Driver Mode.

The first option, and the one encouraged by the agency, is automatic activation, meaning that Driver Mode automatically engages within a reasonable period of time when the portable

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<sup>86</sup> 23 U.S.C. 405(e)(9)(A); 49 CFR 392.80, Executive Order 13513, “Federal Leadership on Reducing Text Messaging While Driving,” October 1, 2009; MAP-21 Public Law 112–114, 126 Stat. 405 (July 6, 2012).

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device by itself or in conjunction with the vehicle distinguishes that it is being used by a driver while driving. If desired, the user would have the ability to deactivate or opt-out of automatic engagement of Driver Mode. Like the “driving” condition described in the Phase 1 Guidelines, this definition is based on information (e.g., vehicle speed) that can be determined by the portable device if it has the appropriate sensors like GPS to measure the speed of the motor vehicle, or if the information is transmitted from the vehicle to the portable device. The Phase 1 definition of driving may be suitable if the automatic distinction technology can also access speed or transmission state information directly from the vehicle. Examples of automatic distinction technologies that had direct connection to the vehicle, and therefore could have access to vehicle speed or transmission state, were presented at NHTSA’s Phase 2 Public Meeting.<sup>87</sup> The agency requests comment on whether the final guidelines should include specific triggering factors or a specific timeframe for Driver Mode to automatically activate, such as the vehicle speed (e.g., a speed that can reasonably be attributed to a motor vehicle as opposed to non-motorized transportation) at which an automatic activation would engage, as well as other potential triggering factors. Additionally, NHTSA requests comment on the 5 mph speed threshold applicable to the definition of “driving” for vehicles without a “Park” position (e.g. manual transmission vehicles).

The agency recognizes that automatic activation technologies are still in the process of being refined, and, without the ability to reliably detect whether the device user is the driver or a passenger, may be overly annoying to device users. Accordingly, the agency is proposing a second option, voluntary activation, meaning that the Driver Mode is activated in a simple

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<sup>87</sup> Docket No. NHTSA-2013-0137, “Driver Distraction Guidelines (Phase 2) for Portable and After-Market Devices Public Meeting Agenda and Presentations” ID: NHTSA-2013-0137-0004. Available at <http://www.regulations.gov/#!docketDetail;D=NHTSA-2013-0137> (last accessed on 10/4/16).

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manner by the user. In other words, under this option, Driver Mode is manually activated by the driver rather than automatically. The agency expects technologies that support automatic Driver Mode activation to be implemented as soon as practicable. In order to provide flexibility, NHTSA has not included any additional specific recommendations on how activation of Driver Mode should be designed. The agency requests comment on whether additional specification should be included in the final guidelines.

Recognizing that some drivers may choose not to activate Driver Mode, and accordingly, not reduce the distraction potential of the portable device, the agency foresees driver-initiated activation being a temporary option in the Phase 2 Guidelines until driver-passenger distinction technology is more developed and widely available. The agency expects such technology to be implemented as soon as practicable. The agency recognizes the inherent limitations of a driver-activated Driver Mode and seeks comment on alternative approaches to Driver Mode activation as a temporary option until driver-passenger distinction technology is implemented.

#### **E. Aftermarket Devices**

The US DOT's Blueprint for ending Distracted Driving specified that aftermarket electronic devices would be addressed in NHTSA's Phase 2 Guidelines. In line with the Blueprint, the Phase 2 Guidelines propose to make recommendations for aftermarket devices. Tentatively, the agency concludes that recommendations applicable to OE manufacturers in the Phase 1 Guidelines shall be recommendations to aftermarket electronic device manufacturers.

Aftermarket devices include communication, entertainment, or navigation devices that are designed to be or would be reasonably expected to be installed or integrated after the vehicle is manufactured, are often incorporated into existing OE slots in the dashboard or are permanently affixed to the top surface of the dashboard. Examples of aftermarket devices

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include in-dash car stereos/receivers and in-dash navigation devices. While aftermarket devices are addressed in the same guideline document as portable devices, there are notable differences between portable and aftermarket devices. As aftermarket devices are typically hardwired into a vehicle, they are not likely to be moved in and out of a vehicle like portable devices.

Additionally, because there is a physical link between an aftermarket device and the vehicle, there is no need for any pairing recommendation, as the vehicle and aftermarket device are linked by virtue of installation.

With regard to placement within the vehicle, the installation location of an aftermarket device is likely to be either on the dashboard or in a vacated spot in the dash previously occupied by an OE interface. NHTSA has tentatively concluded that because the crash risk associated with distraction caused by OE interfaces and aftermarket devices is borne out of similar visual-manual interaction from the same location in a vehicle, the Phase 2 Guidelines should apply the Phase 1 guidelines to aftermarket devices. In many cases, aftermarket devices serve as replacement devices for vehicle OE systems, replacing the function of OE units while occupying the same location within a vehicle. NHTSA is seeking comment on this approach.

#### **IV. Expected Effects of the Phase 2 Guidelines**

NHTSA's overall expectation for the Phase 2 Distraction Guidelines is to provide a safety framework for developers of portable and aftermarket electronic devices and applications to use when developing their systems that will reduce driver distraction through two specific technological means. First, NHTSA envisions easy pairing solutions for users of portable devices in their vehicles that will result in accelerated growth and acceptance of pairing, leading to pairing implementations throughout entire vehicle lineups and trim levels. Pairing solutions should become seamless, thereby fostering highly efficient interactions between the drivers,



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portable devices, and in-vehicle electronics systems. Second, NHTSA expects these guidelines will encourage the further growth and innovation of automatic driver distinction technologies that will enable more practical and pervasive Driver Mode implementations for portable devices in unpaired scenarios. The development of automatic driver distinction technologies and consequently Driver Mode interfaces should result in reduced distraction when used by drivers while driving. Again, the agency's goal is that information available to the driver inside the vehicle will not cause an unsafe level of distraction to the driver (either by functions being locked out or conforming to the applicable Phase 1 Guidelines' 2/12 performance criteria).

In addition, NHTSA expects that through these guidelines, automotive OEMs, application developers, portable and aftermarket device manufacturers, operating system providers, wireless carriers, and all involved stakeholders will jointly work together with the primary goal of reducing fatalities, injuries, and crashes attributable to the use of portable and aftermarket devices by drivers. NHTSA expects that the proposed guidelines will serve as a framework for stakeholders to continue developing a variety of technologies and designs that reduce visual-manual distraction while driving. Ultimately, these proposed Guidelines will raise awareness of driver distraction and elevate vehicle safety to a top priority within the product development processes for these wide-ranging organizations.

#### **A. Estimated Time for Conformance**

NHTSA wants to make it absolutely clear that since its Driver Distraction Guidelines are voluntary and non-binding, they do not have a "lead time" in the same way that a FMVSS or other regulation has a lead time. Portable and aftermarket device manufacturers, application developers, and vehicle manufacturers are not required to meet the NHTSA Guidelines.

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NHTSA stated that it anticipated vehicle manufacturers would incorporate Phase 1 conformance into their normally scheduled production cycles, and therefore NHTSA anticipates seeing production vehicles that conform to Phase 1 Guidelines no sooner than three years from the publication of Phase 1. NHTSA recognizes that the production cycles for portable devices are dramatically shorter than for vehicles; therefore NHTSA seeks comment on reasonable conformance testing timing for Phase 2. We believe 16 months is appropriate given the speed at which technology changes and the time needed to benchmark product against the final guidelines. We understand that a portable device's ability to pair with a vehicle inherently requires some coordination with vehicle OEMs. We request comment on the appropriateness of this timeframe.

The agency also notes that the Guidelines are just one of many efforts by both government and industry to address the distracted driving problem. The NHTSA Distraction Plan<sup>88</sup> describes the Agency's comprehensive approach to the distraction problem. NHTSA has approached the driver distraction problem from multiple fronts, from a better understanding of the issue of distraction by improving the quality of data on the incidence, prevalence, and crash risk from distraction, to public service messages (e.g., "One text or call could wreck it all"), to working with states on enforcement programs and improving laws, to producing the Distraction Guidelines. Industry has also worked hard to promote anti-driver-distraction awareness and message campaigns, as well as working toward guidance and tools for less distracting devices and built-in user interfaces. NHTSA's Guidelines are an important complementary effort against driver distraction.

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<sup>88</sup> NHTSA. (2010). *Overview of the National Highway Traffic Safety Administration's Driver Distraction Program*, (DOT HS 811 299). Available at [http://www.nhtsa.gov/staticfiles/nti/distracted\\_driving/pdf/811299.pdf](http://www.nhtsa.gov/staticfiles/nti/distracted_driving/pdf/811299.pdf) (last accessed on 10/4/16).

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## **B. NHTSA Monitoring of Portable and Aftermarket Device Conformance with the Guidelines**

NHTSA's Office of Vehicle Safety Research intends to perform future monitoring to assess conformance to our Driver Distraction Guidelines. Whereas the details of this monitoring have yet to be determined, we plan to test actual production vehicles, and production portable and aftermarket devices. Vehicles, portable and aftermarket devices, and applications will be selected for such monitoring so that they represent a representative portion of makes and models available for public consumption. NHTSA envisions that these test results would be made available to the public.

## **V. Authority to Issue the Phase 2 Guidelines**

The agency's authority to issue the voluntary, non-binding<sup>89</sup> Phase 2 Guidelines is clear under both the Highway Safety Act and the Vehicle Safety Act.<sup>90</sup> NHTSA's statutory mandate is to reduce traffic accidents and deaths and injuries resulting from traffic accidents.<sup>91</sup> To carry out this mandate, NHTSA is authorized to conduct and act on both behavioral safety and vehicle safety research. Congress directed the Secretary of Transportation, through amendments to the Highway Safety Act, to *assist and cooperate with private industry* (among others) to increase

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<sup>89</sup> See Fixing America's Surface Transportation Act, Pub. L. No. 114-94, § 24406 (2015) ("No guidelines issued by the Secretary with respect to motor vehicle safety shall confer any rights on any person, State, or locality, nor shall operate to bind the Secretary or any person to the approach recommended in such guidelines").

<sup>90</sup> We note that questions have been raised by, among others, CTA and CTIA concerning NHTSA's authority to regulate portable devices and applications. Although not at issue in these voluntary guidelines, the agency points out that it has such authority to the extent these technologies function as "motor vehicle equipment" as defined by the Vehicle Safety Act. That said, NHTSA does not have any current plans to develop such regulations and, as we explain throughout, the guidelines proposed today are not regulations, but are rather voluntary and non-binding.

<sup>91</sup> 49 U.S.C. § 30101 ("The purpose of this chapter is to reduce traffic accidents and deaths and injuries resulting from traffic accidents. Therefore it is necessary-- (1) to prescribe motor vehicle safety standards for motor vehicles and motor vehicle equipment in interstate commerce; and (2) to carry out needed safety research and development."). Delegated to NHTSA at 49 CFR 1.95.

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highway safety.<sup>92</sup> Additionally, the Vehicle Safety Act states NHTSA “shall conduct research, development, and testing on any area or aspect of motor vehicle safety necessary to carry out this chapter.”<sup>93</sup> More specifically, NHTSA “shall . . . 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.”<sup>94</sup>

By issuing these Guidelines, NHTSA seeks to fulfill its duties under both the Highway Safety Act and the Vehicle Safety Act. The foundation for these Guidelines is the agency research on distraction caused by portable and aftermarket devices, and our evaluation of research from other experts. The agency believes that today’s guidelines are an effective way of expressing NHTSA’s research conclusions. Encapsulating and publishing research results in the form of recommendations, best practices, or guidelines is not novel for this agency.<sup>95</sup> Further, these Guidelines are a way for NHTSA to provide private industry with assistance on practical ways of applying the existing research to their portable application/device designs so as to encourage their customers to use these devices and applications appropriately when in the motor vehicle. Moreover, by releasing these guidelines for public comment, we are cooperating with private industry and other members of the public toward increasing highway safety in this important area.

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<sup>92</sup> 23 U.S.C. § 401. Delegated to NHTSA at 49 CFR 1.95.

<sup>93</sup> 49 U.S.C. § 30181. Delegated to NHTSA at 49 CFR 1.95.

<sup>94</sup> 49 U.S.C. § 30182 (“Powers and duties”). Sections 30181-30182 were added to the Safety Act by the Moving Ahead for Progress in the 21st Century Act (MAP-21), Pub. L. No. 112-141, § 31204 (2012). Prior to this, the Safety Act provisions authorizing NHTSA’s motor vehicle safety research and development were contained in § 30168. MAP-21 deleted § 30168 as redundant material. *See* MAP-21 § 31204. Delegated to NHTSA at 49 CFR 1.95.

<sup>95</sup> *See, e.g.*, Effectiveness and Acceptance of Enhanced Seat Belt Reminder Systems: Characteristics of Optimal Reminder Systems Final Report, DOT HS 811 097, § 5.4 (“Recommended System Characteristics”) (2009).

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Additionally, we note that in recently enacting the Fixing America's Surface Transportation Act,<sup>96</sup> Congress included a provision regarding the agency's ability to issue non-binding guidance. While the provision provides that "[n]othing in the subsection shall be construed to confer any authority upon or negate any authority of the Secretary to issue guidelines under this chapter," we note that the only such guidelines that the agency has issued or announced plans to issue in recent years are those relating to distraction.

As NHTSA has stated in various agency documents, the guidelines for portable devices are a crucial part of a *comprehensive, multi-pronged effort* to address driver distraction. Taking a comprehensive approach that addresses behavioral, technological, and environmental risk factors is standard practice in the injury prevention field.<sup>97</sup> While the states' achievements in addressing the behavioral aspects of distracted driving are commendable, we believe more needs to be done to address the other two types of risk factors. As we mentioned earlier, the 2014 statistics show that, taking account of all different types of distractions, a substantial portion (10%) of all fatal crashes still involves at least one distracted driver. Further, a substantial portion of distraction-affected fatal crashes (13%) involve cell phone use. NHTSA estimates that 404 lives were lost in cell phone-involved fatal crashes in that year. This represents 1.2 percent of traffic fatalities for that year.

Accordingly, we believe that private industry could effectively complement the state efforts by addressing the technological risk factors related to portable application/device use and driving. Furthermore, the relationship between portable devices/applications and driver

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<sup>96</sup> Pub. L. No. 114-94, § 24406 (2015).

<sup>97</sup> The interrelationship of the elements of this practice is graphically depicted in the well-known analytical and planning tool known as the Haddon Matrix.

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distraction makes it incumbent upon the US DOT to utilize NHTSA's safety expertise to assist private industry in understanding and addressing issues related to the effects of portable application/device design on driver behavior. The contribution of these devices to driver distraction is an important and growing motor vehicle safety challenge. However, manufacturers of these products generally do not have motor vehicle safety expertise, or do not design their products with full knowledge of the potential effects on driving, especially those devices designed for general use, rather than specifically for use while driving. In developing these guidelines in consultation with industry and the public, NHTSA is using its expertise regarding the variety of factors<sup>98</sup> that adversely affect driver performance to assist private industry in improving portable devices/applications in ways that increase highway safety by making it easier for the driver to avoid engaging in distracting behaviors.

## **VI. Public Participation**

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

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

Your comments should not be more than 15 pages long. (See 49 CFR 553.21.) We 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.

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<sup>98</sup> In addition to distraction, these factors include problems like fatigue, sleepiness, and intoxication.

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Comments may be submitted to the docket electronically by logging onto the Docket Management System website at <http://www.regulations.gov>. Follow the online instructions for submitting comments.

You may also submit two copies of your comments, including the attachments, to Docket Management at the address given above under ADDRESSES.

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 Office of Management and Budget (OMB) and US DOT Data Quality Act guidelines. Accordingly, we encourage you to consult the guidelines in preparing your comments. OMB's guidelines may be accessed at <http://www.whitehouse.gov/omb/fedreg/reproducible.html>. The US DOT's guidelines may be accessed at [https://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/subject\\_areas/statistical\\_policy\\_and\\_research/data\\_quality\\_guidelines/html/guidelines.html](https://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/subject_areas/statistical_policy_and_research/data_quality_guidelines/html/guidelines.html)

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

If you 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.

**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 Chief Counsel, NHTSA, at the address given above under FOR FURTHER INFORMATION CONTACT. In addition, you should submit two copies, from which you have deleted the claimed confidential business information, to Docket Management at

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the address 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 our confidential business information regulation. (49 CFR Part 512.)

**Will the agency consider late comments?**

We will consider all comments that Docket Management receives before the close of business on the comment closing date indicated above under DATES. To the extent possible, we will also consider comments that Docket Management receives after that date. If a comment is received too late for us to consider in developing the final guidelines, we will consider that comment as an informal suggestion for future guidelines.

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

You may read the comments received by Docket Management 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. To read the comments on the Internet, go to <http://www.regulations.gov>. Follow the online instructions for accessing the docket.

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.

**VII. National Technology Transfer and Advancement Act of 1995 (NTTAA)**

Under the National Technology Transfer and Advancement Act of 1995 (NTTAA) (Public Law 104-113), all Federal agencies and departments must use technical standards that are developed or adopted by voluntary consensus standards bodies, using such technical standards as



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a means to carry out policy objectives or activities determined by the agencies and departments, except when use of such a voluntary consensus standard would be inconsistent with the law or 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 SAE International (SAE). The NTTAA directs agencies to provide Congress, through OMB, explanations when the agency decides not to use available and applicable voluntary consensus standards.

As part of the Phase 1 Guidelines, NHTSA identified a number of voluntary consensus standards related to distracted driving. After careful consideration, the agency incorporated several of these standards into the test methods in the Phase 1 Guidelines: ISO International Standard 15008:2003, “Road vehicles — Ergonomic aspects of transport information and control systems — Specifications and compliance procedures for in-vehicle visual presentation”; ISO International Standard 16673:2007(E), “Road Vehicles – Ergonomic Aspects of Transport Information and Control Systems – Occlusion Method to Assess Visual Demand due to the use of In-Vehicle Systems”; and multiple versions of SAE Recommended Practice J941, “Motor Vehicle Drivers’ Eye Locations,” including SAE J941 (June 1992), SAE J941 (June 1997), SAE J941 (September 2002), SAE J941 (October 2008), and SAE J941 (March 2010). Because the proposed Phase 2 Guidelines involve the use of the Phase 1 Guidelines test procedure, with several modifications, as described in detail above, these standards are, by extension, included by reference in the Phase 2 Guidelines.

The agency requests comment on any other voluntary consensus standards appropriate for use in these Guidelines.

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## **VISUAL-MANUAL NHTSA DRIVER DISTRACTION GUIDELINES FOR PORTABLE AND AFTERMARKET DEVICES (PHASE 2 GUIDELINES)**

### **I. PURPOSE**

The purpose of the NHTSA driver distraction guidelines is to reduce the number of motor vehicle crashes and the resulting deaths and injuries that occur due to a driver being distracted from the primary driving task while performing secondary activities with a portable or aftermarket device within the vehicle.

Phase 2 extends and tailors the recommendations specified in the Phase 1 Visual-Manual NHTSA Driver Distraction Guidelines for In-Vehicle Electronic Devices (henceforth referred to as “Phase 1 Guidelines”) to cover portable and aftermarket devices. These Guidelines are presented as an aid to vehicle manufacturers, portable and aftermarket device manufacturers, developers, carriers, and application developers in designing products that discourage unsafe driver distraction resulting from use of the devices. Adherence to these guidelines is voluntary and conformance with them is not required.

#### **A. Driver Responsibilities.**

These Guidelines are meant to reduce the potential distraction associated with portable and aftermarket device interfaces. A portable or aftermarket device’s conformance with these Guidelines does not mean that the device is safe to use while driving. It remains the driver’s responsibility to ensure the safe operation of the vehicle under all operating conditions and to comply with all traffic laws, including those that ban texting and/or the use of hand-held devices while driving.

### **II. Scope**

#### **A. Devices and Interfaces.**

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1. *General Device and Interface Applicability.* These Guidelines are applicable to the visual-manual portions of a portable or aftermarket device's human-machine interface. These Guidelines are applicable to device interfaces regardless of the class or size of the vehicles in which the portable or aftermarket devices may be used.

2. *Exclusions.*

These Guidelines are not applicable to:

a. The auditory-vocal portions of a portable or aftermarket device's human-machine interface.

b. A device manufactured primarily for use in one of the following:

1. Ambulances

2. Firefighting vehicles

3. Military vehicles

4. Vehicles manufactured for use by the United States Government or a State or local government for law enforcement, or

5. Vehicles manufactured for other emergency uses as prescribed by regulation by the Secretary of Transportation.

c. A device or device function, control, and/or display specified by Federal, State, or local law or regulation.

**B. Tasks.**

1. *General Task Applicability.* These Guidelines are applicable to the same types of tasks covered by the Phase 1 Guidelines, including all *non-driving-related tasks*

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and some *driving-related tasks*. Table 1 contains a non-exhaustive list of the types of non-driving-related tasks to which these Guidelines are applicable.

**Table 1 - Non-Driving-Related Tasks/Devices to Which These Guidelines Apply**

<b>Type of Task</b>	<b>Task/Device</b>
Communications	Caller Identification Incoming Call Management Initiating and Terminating Phone Calls Conference Phoning Two-Way Radio Communications Paging Address Book Reminders Text-Based Communications Social Media Messaging or Posting
Entertainment	Radio (including but not limited to AM, FM, Internet, and Satellite) Pre-recorded Music Players, All Formats Television Video Displays Advertising Internet Browsing News Directory Services
Information	Display and other information settings and preferences

These Guidelines are also applicable to *driving-related tasks* that are neither related to the safe operation and control of the vehicle nor involve the use of a system required by law. Examples of *driving-related tasks* to which these Guidelines are applicable include:

1. Driver Information functions
2. Route navigation functions.

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2. *Exclusions.* These Guidelines are not applicable to the *driving-related tasks* that are performed by the driver as part of the safe operation and control of the vehicle, including any task relating to the proper use of a driver safety warning system (e.g., lane departure warning and forward collision warning systems). These include applications for portable and aftermarket devices that assist the driver in the mitigation and avoidance of crashes.

### III. DEFINITIONS

**A. Definitions from the Phase 1 Guidelines.** The following terms are defined in the Phase 1 Guidelines, and have the same meaning in these Guidelines:

1. *Device* means all components that a driver uses to perform secondary tasks (i.e., tasks other than the primary task of safe operation and control of the vehicle); whether stand-alone or integrated into another device.
2. *Distraction* means the diversion of a driver's attention from activities critical for safe operation and control of a vehicle to a competing activity.
3. *Driving* means whenever the vehicle's means of propulsion (engine and/or motor) is activated unless one of the following conditions is met:
  - a. For a vehicle equipped with a transmission with a "Park" position – The vehicle's transmission is in the "Park" position.
  - b. For a vehicle equipped with a transmission without a "Park" position – All three of the following conditions are met:
    - i. The vehicle's parking brake is engaged, and
    - ii. The vehicle's transmission is known (via direct measurement with a sensor) or inferred (by calculating that the rotational speed of the

engine divided by the rotational speed of the driven wheels does not equal, allowing for production and measurement tolerances, one of the overall gear ratios of the transmission/vehicle) to be in the neutral position, and

- iii. The vehicle's speed is less than 5 mph.
- 4. *Function* means an individual purpose which the device is designed to fulfill. A device may have one or more functions.
- 5. *Interaction* means an input by a driver to a device, either at the driver's initiative or as a response to displayed information. Interactions include control inputs and data inputs (information that a driver sends or receives from the device that is not intended to control the device). Depending on the type of task and the goal, interactions may be elementary or more complex. For the visual-manual interfaces covered by this version of these Guidelines, interactions are restricted to physical (manual or visual) actions.
- 6. *Lock Out* means the disabling of one or more functions or features of a device so that the related task cannot be performed by the driver while driving.
- 7. *Manual Text Entry* means manually inputting individual alphanumeric characters into an electronic device. For the purposes of these Guidelines, digit-based phone dialing is not considered manual text entry.

## **B. Additional Definitions**

- 1. *Aftermarket Device* means a Device that is designed to be or can reasonably be expected to be installed or integrated into a vehicle after the vehicle is

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manufactured, is electrically powered, and has one or more of the following capabilities:

- a. Allows user interaction;
  - b. Enters, sends, and/or receives information;
  - c. Enables communication with other people, devices, or machines;
  - d. Displays information in a visual and/or auditory manner; or
  - e. Displays graphical images, photographic images, and/or video.
2. *Application*, or *App*, means a specialized software program that is installed on an OEM, portable or aftermarket device.
  3. *Driver Mode* means a simplified user interface for an unpaired portable device that is designed for operation by a driver while driving.
  4. *Driver safety warning system* means a system or application that is intended to assist the driver in the avoidance or mitigation of crashes.
  5. *Human-Machine Interface (HMI)* means the input and output mechanisms that mediate the interactivity between an electronic system and human operator. User Interface (UI) is another commonly used term for HMI.
  6. *In-Vehicle System* means an OEM or aftermarket system that is permanently installed.
  7. *PAD* means a portable or aftermarket device.
  8. *Paired* means integrated, connected, or coupled to an in-vehicle system's visual display, audio system, and/or controls through either wired or wireless connection methods so that the in-vehicle system has control over the portable device's

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prioritization, manipulation, and the presentation of information that originates from both local and/or off-board sources.

9. *Portable Device* means a device that can reasonably be expected to be brought into a vehicle on a trip-by-trip basis and to be used by a driver while driving, that is electrically powered, and that has one or more of the following capabilities:
- a. Allows user interaction
  - b. Enters, sends, and/or receives information
  - c. Displays information in a visual and/or auditory manner, or
  - d. Displays graphical images, photographic images, and/or video

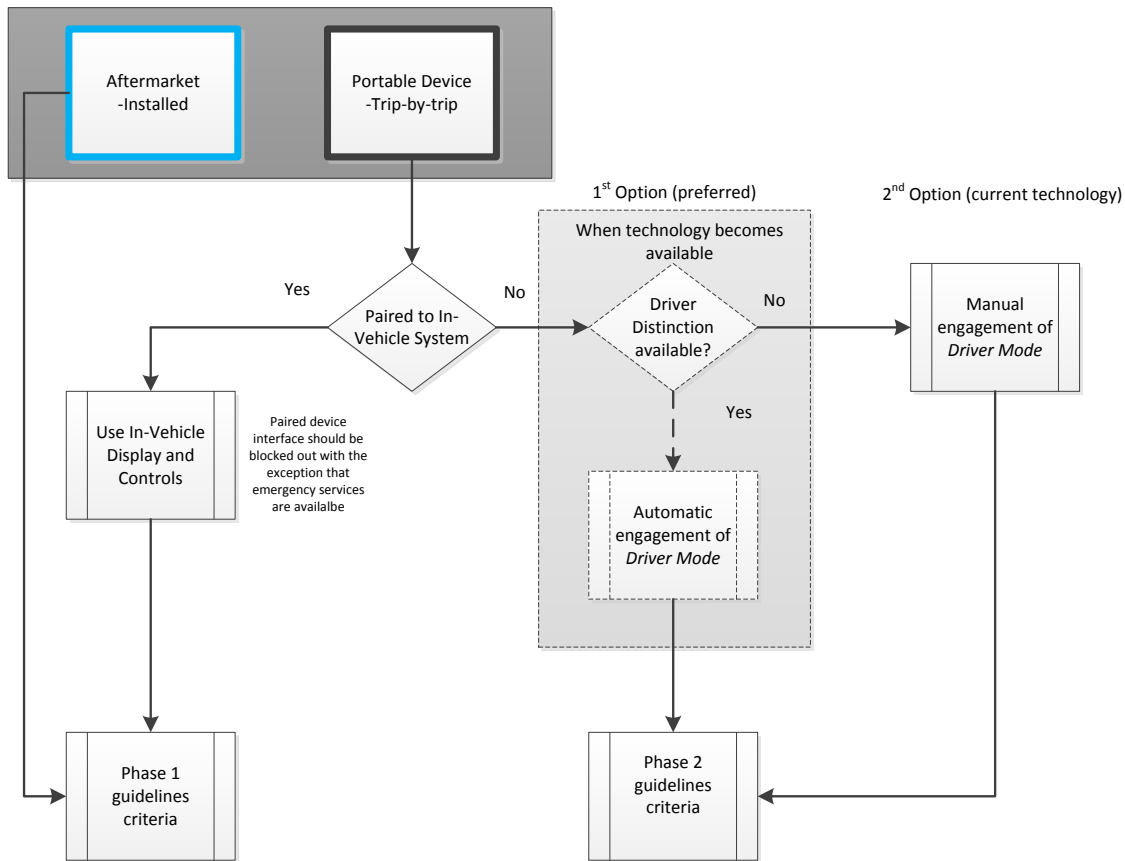
#### **IV. *DEVICE INTERFACE RECOMMENDATIONS***

##### **A. *Overview of Device Interface Recommendations***

Figure 2 below is a flow diagram that summarizes the overall recommendations for both portable and aftermarket devices. For the Driver Mode recommendation, the diagram depicts the preferred automatic activation with the recognition that driver distinction technology is not currently available in a product-level state. When the distinction technology matures to an implementable state, NHTSA strongly recommends that it be applied to managing the interaction of unpaired portable devices. Manual activation of Driver Mode by the driver, also depicted in Figure 2, is NHTSA's temporary recommendation until the preferred automatic activation configuration is available. For the remainder of this section, the recommendations for aftermarket and portable devices are presented separately.



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**Figure 2. Flow diagram that summarizes the overall recommendations for both portable and aftermarket devices.**

## **B. Aftermarket Devices**

Installed aftermarket devices should meet the requirements as specified for OE interfaces in the Phase 1 Guidelines.

## **C. Portable Devices Should Be Paired**

### *1. Ease of Pairing*

Vehicle manufacturers and portable device manufacturers should provide the necessary mechanisms to enable pairing between the portable device and in-vehicle system. Pairing should be an easy-to-understand task that allows the driver to set up their portable device with their in-vehicle system with the fewest number of steps possible.

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2. *Disablement of Pairing Process*

If the initial or subsequent pairing process between the portable device and in-vehicle system requires visual-manual interaction by the driver, the initial process of pairing should be disabled while driving.

3. *Portable Device Interface Lock Outs while Paired*

Portable device control input means should be locked out when the portable device is paired to the in-vehicle system and Driver mode on the device is activated. The functions and applications on the portable device should be operable exclusively through the in-vehicle system's interface with the exception of accessing emergency services and messages.

4. *Emergency Services, Alerts, and Notifications*

In the event that emergency services are required, access through the locked out paired portable device interface should be quick and easily accessible for the driver. Along with access to emergency services, the receiving of emergency notifications and alerts as text messages should be allowable for display on the paired portable device interface. All emergency messaging and alert services should follow the standard protocol as specified by the Wireless Emergency Alerts (WEA) system which is managed by the Federal Communications Commission (FCC) and the Federal Emergency Management Agency (FEMA).

**D. Portable Devices Should Incorporate Driver Mode for Unpaired Use**

1. *Driver Mode*

Portable devices should have a Driver Mode that consists of a simplified interface that is available to the driver when the device is unpaired, either because the in-vehicle

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system and/or portable device does not possess the capability for pairing or because the driver chooses not to pair with the in-vehicle system. However, a portable device designed primarily for use while driving and whose native interface design conforms to the Phase 1 Guidelines recommendations can be considered to essentially always be in driver mode and therefore would not warrant a separate mode for use while driving.

The Driver Mode interface should conform to the Phase 1 Guidelines for electronic devices used by the driver while driving. Specifically, while in Driver Mode, the portable device should adhere to the per se lock out tasks listed in sections V.F.1 through V.F.6 of the Phase 1 Guidelines.

1. Device functions and tasks not intended to be used by a driver while driving
2. Manual text entry
3. Displaying video
4. Displaying images
5. Automatically scrolling text
6. Displaying text to be read

Driver Mode should also lock out any *non-driving-related task* or *driving-related task* that does not conform to one of the task acceptance methods in Section VI of these Guidelines. The portable device should also conform to the following subsections of the Phase 1 Guidelines Section V:

- A. No Obstruction of View
- B. Easy to See and Reach
- F. Per Se Lock Outs (listed in previous paragraph)

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- G. Acceptance Test-Based Lock Out of Tasks
- H. Sound Level
- I. Single-Handed Operation
- J. Interruptibility
- K. Device Response Time
- L. Disablement
- M. Distinguish Tasks or Functions not intended for use while driving
- N. Device Status

2. *Emergency Services, Alerts, and Notifications*

In the event that emergency services are required, access through the portable device Driver Mode interface should be quick and easily accessible for the user. Along with access to emergency services, the receiving of emergency notifications and alerts as text messages should be allowable for display on the Driver Mode interface. All emergency messaging and alert services shall follow the standard protocol as specified by the WEA system which is managed by the FCC and the FEMA.

3. *Driver Mode Activation*

- a. Option 1 – Automatic Activation. Driver mode automatically activates within a reasonable period of time when the portable device: (1) is not paired with the in-vehicle system, and (2) by itself, or in conjunction with the vehicle in which it is being used, distinguishes that it is being used by a driver who is driving. The driver mode does not activate when the device is being used by a non-driver.

- i. Development of technologies that can distinguish between a device being used by a driver and a device being used by a passenger and appropriately alter, limit, or eliminate their visual-manual interfaces when used by a driver is encouraged. In the case in which Driver Mode is automatically activated in a moving vehicle, the technology should be able to distinguish the driver-operated devices from the passenger-operated devices to a high-degree of accuracy and reliability; and be executed in a prompt manner relative to the starting motion of the driver's vehicle.
- b. Option 2 – Driver Activation. Driver Mode is activated by the driver before driving. If this option is used, Driver Mode should be easily accessible via the portable device's software or hardware user interface, enabling the driver to engage Driver Mode quickly and with the fewest number of steps possible.

4. *Unpaired Portable Device Location*

A specific location for an unpaired portable device (e.g., mounting location) is not specified in these guidelines. The test location described in the Task Acceptance Testing section is for testing purposes only and not considered a recommendation for device placement.

## **V. TASK ACCEPTANCE TESTING**

Task acceptance testing for portable devices should use the same test methods as those described in the Phase 1 Guidelines Section VI. The specific procedures for Eye Glance

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Measurement Using Driving Simulator Testing and Occlusion Testing are incorporated by reference, as detailed in the following subsections of the Phase 1 Guidelines Section VI:

- A. Test Participant Recommendations.
- B. Test Participant Training Recommendations.
- C. Driving Simulator Recommendations.
- D. Recommended Driving Simulator Scenario.
- E. Eye Glance Measurement Using Driving Simulator Test Procedure.
- F. Eye Glance Characterization.
- G. Occlusion Testing.
- H. Text Performance Errors During Testing.

The Acceptance Criteria detailed in the Phase 1 Guidelines for both the Simulator (Section VI.E.14) and Occlusion (Section VI.G.17) test methods are also applicable for testing portable devices.

**A. Additional Test Procedures for Portable and Aftermarket Devices.**

- 1. Permanently Installed Aftermarket Devices. Devices that are intended to be permanently installed in the vehicle should be tested in the location prescribed by the device manufacturer, and according to the test procedures noted above. Such prescribed installation locations should conform to the guidelines specified in the following subsections from Phase 1 Guidelines Section V:

- A. No Obstruction of View.
- B. Easy to See and Reach.
- C. Maximum Display Downward Angle.

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D. Lateral Position of Visual Displays.

2. Paired Devices: Testing procedures assume the portable device is already paired to the vehicle system, as defined in Section III. Because the testing of the paired portable device will use the built-in display and controls system, the location of the paired portable device itself is not specified.
3. Unpaired Devices: Unpaired portable devices should only be tested in a mounted location using tasks that are accessed through the Driver Mode interface. NHTSA recognizes that there are substantial variations in portable device mounting hardware options and vehicle interior designs that are available to drivers. As such, unpaired portable devices should be mounted within a vehicle to the greatest extent possible to the following recommendations:
  - a. The mount location should conform to the recommendations specified in the Phase 1 Guidelines Section V.A through Section V.D noted above.
  - b. The mounting location should not result in the portable device interfering with airbag deployment zones or safe operation of the vehicle controls (e.g., steering wheel, gear shifter, etc.).

**VI. DRIVER DISTRACTION GUIDELINES INTERPRETATION LETTERS**

NHTSA intends to clarify the meaning of its Driver Distraction Guidelines in response to questions posed through the issuance of interpretation letters.

**A. Guideline Interpretation Letter Procedure.**

1. Guidelines interpretation letters will only be issued in response to specific written requests for interpretation of the NHTSA Guidelines.

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2. Requests for Guidelines interpretation letters may be submitted to the National Highway Traffic Safety Administration. The mailing address is:

Chief Counsel  
NCC-200  
National Highway Traffic Safety Administration  
1200 New Jersey Ave., S.E.  
Washington, DC 20590

3. Responses will be mailed to requestors, published in the docket, and posted in a designated area on the NHTSA website.

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under authority delegated by 49 CFR 1.95.

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Vehicle Safety Research

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[Signature Page for Phase 2 Visual-Manual NHTSA Driver Distraction Guidelines for Portable and Aftermarket Devices]