



American Association of  
Motor Vehicle Administrators

# vehicle SKILLS technologies *driver ADAS* *assistance* license testing SYSTEMS



## Guidelines for Testing Drivers in Vehicles with Advanced Driver Assistance Systems



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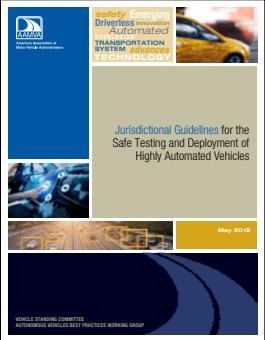
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# Executive Summary

The American Association of Motor Vehicle Administrators (AAMVA) has been leading an effort to assist its members to advance their understanding of vehicle technologies designed to perform and/or assist in some or all of the dynamic driving tasks that humans perform today.

*Jurisdictional Guidance for the Safe Testing and Deployment of Highly Automated Vehicles*, published by AAMVA in May 2018, primarily focuses on Automated Driving Systems (ADS), which are defined by the Society of Automotive Engineers (SAE) International as levels 3, 4, or 5 of driving automation.



As the AAMVA community became more informed, it began to understand the impact vehicle technologies, found in SAE-defined levels 0, 1, and 2 are already having on driver licensing programs. It became clear that there was a need to update driver license testing systems, including driver license manuals, driver license knowledge tests, skills tests, and examiner training, by incorporating information and testing procedures that address the technology, referred to as Advanced Driver Assistance Systems (ADAS). ADAS are becoming increasingly common and in some cases assist the driver but do not perform the driving function. ADAS are designed to help drivers with certain driving tasks (e.g., staying in the lane, parking, braking, avoiding crashes, reducing blind spots, and maintaining a safe space cushion). ADAS are designed to improve vehicle and road safety.<sup>[1]</sup>

\* [1] National Highway Traffic Safety Administration. (2018). *Preparing for the Future of Transportation: Automated Vehicles 3.0*. U.S. Department of Transportation.

## Terminology

AAMVA based this report on information and terms used on the website [MyCarDoesWhat.org](http://MyCarDoesWhat.org), which was developed by the National Safety Council and the University of Iowa.

Vehicle manufacturers use a wide variety of terms to describe and market ADAS technology in vehicles. In 2019, the American Automobile Association (AAA) published a document that illustrates the wide variety of names used for ADAS features and suggests possible terms that could be used to advance standardization. AAMVA supports AAA's efforts and will continue to update documents with the appropriate terminology as consistency and standardization occur.

## Driver Licensing Systems

To meet the changing needs in driver testing, jurisdictions will need to revise their driver testing programs as vehicle technologies continue to evolve.



This includes enhancing:

- skills tests,
- driver license testing materials, and
- driver license examiner training.

## Skills Testing

Vehicle technology presents challenges for the driver license skills testing process, including a determination

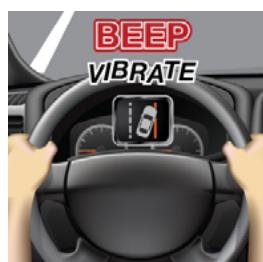
of what technologies are permitted during skills testing procedures.

The purpose of the driver license skills test is to determine an applicant's skill in operating a motor vehicle in most road situations. The applicant may be assisted by vehicle safety technology such as back-up cameras but should not be assisted by vehicle convenience technologies such as automated parallel parking. Skills testing evaluates the applicant's abilities, not the vehicle's technology.

Some technologies cannot be disengaged, and their use should be permissible during the testing process (e.g., lane departure warnings). The applicant should demonstrate proper responses to the technologies.

Even though a vehicle has technological features, the applicant must demonstrate the ability to operate the vehicle in case the technologies require the driver to disengage them manually, they become inoperable, or the driver operates another vehicle without the technology.

Most skills tests do not currently accommodate the use of ADAS. This document offers jurisdictions a guide to educate their examiners on these technologies and help integrate them into the skills test. Jurisdictions will need to determine when and how driver behaviors and responses to certain technologies should be scored. It will also be necessary for examiners to continue to validate the severity of each situation as they do today.



## Driver License Testing Materials

Most jurisdictional driver's manuals do not currently contain information on ADAS and will need to be updated to include pertinent information on vehicle technology. Knowledge tests will also need to be updated to include questions on vehicle technology contained in the driver's manual.



## Driver License Examiner Training

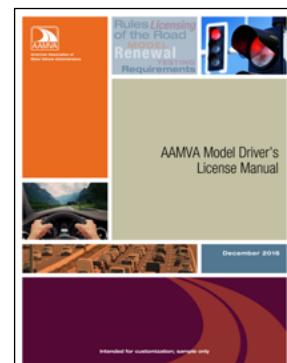
The training of driver license examiners on these technologies should keep pace with this evolution and will need to be updated on a regular basis as the technologies continue to evolve.

### Updating Driver License Testing Materials

AAMVA's Test Maintenance Subcommittee (TMS) and the International Driver Examiner Certification (IDEC) Board recognize that vehicle technologies are emerging faster than driver license test design and examiner training can keep pace. They realize updates to the driver license testing process need to occur and will need to be revised regularly. As a result, they are developing resources for jurisdictions to guide them as they incorporate new vehicle technology into examination programs. AAMVA's IDEC model training materials will be updated in the future to include vehicle technologies. The TMS and IDEC will update the Noncommercial Model Driver Testing (NMDTS) and Commercial Driver's License (CDL) Testing Systems, which will benefit jurisdictions who chose to adopt the newly updated system.

In the interim, the TMS and IDEC, along with the AAMVA Autonomous Vehicle Best Practices Working Group, developed this guide: *Driver Examiner's Guide for Testing Drivers in Vehicles with Advanced Driver Assistance Systems*. It is intended to assist members as they review and update their driver examination policies and procedures to address new vehicle technologies. It outlines technologies and implications for testing and provides recommendations for testing procedures and examiner training.

Standardized testing procedures and driver's manual information will ensure consistent driver testing practices for applicants testing in vehicles with advanced technologies.



# Introduction

Driver license examiners have a unique responsibility for ensuring that drivers who are granted driver's licenses have the knowledge and skills required for the safe operation of their vehicles. As crashes increase, licensing is seen as one way of improving highway safety. Examiners play an important role in the driver licensing process, and it is important that examiners are informed and educated on technologies that may affect the scoring of a licensing exam so they are able to administer exams that are unbiased and objective.

As vehicle technologies continue to evolve, examiners will be faced with greater challenges in determining a driver license applicant's eligibility for full licensure. Examiners will need to examine and base their decisions on the outcomes of the test and grading the actions of the applicant, not the vehicle.

This document focuses on the technology classified by the Society of Automotive Engineers International (SAE) as Advanced Driver Assistance Systems (ADAS) levels 1 and 2. It does not include automated driving systems (ADS) in vehicles, also known as self-driving

autonomous vehicles classified by the SAE as vehicle automation levels 3, 4, and 5. Refer to AAMVA's *Jurisdictional Guidance for the Safe Testing and Deployment of Highly Automated Vehicles*, published by AAMVA in May 2018.

ADAS are becoming increasingly common. These technologies assist the driver but do not perform the driving function. They are designed to enhance the safe operation of the vehicle by helping drivers with certain tasks (e.g., staying in the lane, avoiding crashes, reducing blind spots, and maintaining a safe space cushion). With respect to automation, some ADAS features are classified by the SAE as vehicle automation levels 1 or 2, but many are level 0 and may provide alerts to the driver with little or no automation.\* For example the back-up warning feature lets the driver know, through a sound, vibration, or a mix, if there is an object or car directly behind the driver, but the feature will not automatically brake for the driver.

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\* National Highway Traffic Safety Administration. (2018). *Preparing for the Future of Transportation: Automated Vehicles 3.0*. U.S. Department of Transportation.

# Structure of This Document

The following guidelines apply to noncommercial and commercial vehicles unless prohibited by state and federal law.

This document is divided into two sections: Vehicle Warning Systems Technologies and Vehicle Assistance Systems Technologies.

1. Vehicle warning systems technologies notify the driver with a warning, by sound, light, or vibration, that a crash is about to occur, or it provides an alert that there is a problem or malfunction. Most of these technologies are passive, meaning they warn the driver of a potential issue but do not automatically prevent a problem or crash. The driver may need to make changes to the operation of the vehicle to prevent a problem or crash.
2. Vehicle assistance systems technologies assist the driver in avoiding a hazard or crash. Some automatically make adjustments to the operation of the vehicle, and some assist the driver in making adjustments, such as braking or steering. The driver may still need to make changes to the operation of the vehicle to prevent a problem or crash, but the vehicle assists.

In each of these sections, the vehicle technologies are discussed and include:

- a description of the technology,
- how the technology works,
- whether it is a safety or convenience technology,
- considerations for testing,

- guidance for skills testing and examiner training, and
- considerations for driver's manuals.

The *Guidance for Skills Testing and Examiner Training* sections in the document provide recommendations on whether the vehicle technology should be permitted for use during the testing process and uses the terms “safety critical technologies” and “convenience technologies” as defined in *Section 5.5 Driver License Skills Testing with Automated Vehicle Technologies* of AAMVA’s *Jurisdictional Guidelines for the Safe Testing and Deployment of Highly Automated Vehicles*.

- Convenience technologies are technologies that provide conveniences for the driver (e.g., parking assist feature or auto-cruise control) and do not require the applicant to demonstrate a required skill set. Convenience technologies **should not** be permitted for use during the testing process.
- Safety critical technologies are technologies that may prevent or reduce the severity of a crash. These technologies (e.g., rear or other cameras, alerts, lane departure warning, emergency braking assist) **should be** permissible and should not be disengaged during the testing process.

Some of the content and images used in Sections 1 and 2 of this document are courtesy of the National Safety Council and can be found on their website.

# Universal Considerations for Driver Testing and Examiner Training

The following are universal considerations that should be applied to each of the ADAS technologies for driver testing and examiner training.

- **Sensor operation:** In some cases, the device may be inoperable. This should not affect the drive test scheduled. For safety, it is important for the applicant to check the vehicle technology sensors, prior to the testing process to ensure they are in working order (e.g., not covered with dirt or snow).
- **Functionality:** Vehicle technologies share similar functions and may use proprietary titles. This document uses general terms to define such systems. Some of these systems perform similar functions in slightly different ways depending on manufacturer and specific technology.
- **Driver's manuals:** Jurisdictional driver's manuals may need to be updated to include pertinent information on vehicle technologies and identify if they are permitted during the driver testing process. The manuals should encourage drivers to monitor ADAS technologies and learn how to react when multiple warnings or vehicle control systems activate. Driver's manuals will need to identify which technologies are permissible during testing.
- **Knowledge tests:** Jurisdictional knowledge tests may need to be updated to include questions on ADAS technologies contained in the driver's manual.
- **Scoring skills tests:** Jurisdictional skills tests may need to be updated to accommodate and address the use of advanced driver system technologies.

When scoring any of the safety critical technology items, discretion of the examiner is necessary when determining if an applicant should be scored. There

may be times the safety feature is activated beyond the applicant's control (e.g., a pedestrian unexpectedly steps into the roadway). When scoring a skills test, examiner discretion may be used if the safety feature activates when the applicant is sitting still and has done nothing wrong.

Examiners need to examine and base their decisions on the outcomes of the test and score on the actions of the applicant, not the vehicle. The technologies provide added features to the vehicle. The examiner must determine if the applicant is performing proper driving behavior.

- **Automatic failures:** Jurisdictions will need to determine which behaviors, or repeated behaviors, should be treated as an automatic failure (e.g., failure to yield or an avoidable incident), if applicable. The examiner must evaluate the severity of each situation. A jurisdiction may wish to issue an automatic failure after a designated number of repeated occurrences.
- **Examiner training materials:** Examiner training materials may need to be updated to include ADAS technologies and indicate which safety features will be permitted for testing and that they should not be deactivated.
- **Updating testing materials:** Jurisdictions will need to determine how to incorporate this additional information into their current driver's manual, knowledge tests, and skills tests. They will need to determine the priorities for revisions. AAMVA will provide guidance in future iterations of this document as well as the AAMVA Noncommercial Model Driver Testing (NMDTS) and Commercial Driver's License (CDL) Test System.

## Section One

# Vehicle Warning Systems Technologies

The primary purpose of these technologies is to provide warnings to the driver in specific circumstances. Vehicle warning systems technologies notify the driver with a warning, by sound, light, or vibration, that a crash is about to occur, or it provides an alert that there is a problem or malfunction. Most of these technologies are passive, meaning they warn the driver of a potential issue but do not automatically prevent a problem or crash. The driver may need to make changes to the operation of the vehicle to prevent a problem or crash.

## Back-up warning



**Description:** Uses rear sensors to scan for objects behind the vehicle and alerts the driver if an object is detected.

**How It Works:** The back-up warning feature scans behind the vehicle when the driver shifts into reverse. It will let the driver know – through a sound, vibration, or a mix – if there is an object or car directly behind the driver.



**Safety Critical Technology:** Back-up warning is a “safety critical” technology that may prevent a crash.

**Considerations for Testing:** Applicants should demonstrate all necessary behaviors for safely monitoring and maneuvering their vehicle while backing. These include checking all of the following:

- side mirrors,
- rear-view mirror,
- over the shoulders (head checks), and
- camera(s), if equipped.



### *Back-up warning (continued)*

The proper response to a back-up warning alone does not demonstrate the applicant's ability to safely monitor and maneuver the vehicle during backing. The back-up warning is intended to provide an additional monitoring resource to mirrors and head checks. Applicants should not become complacent and dependent on back-up warning systems for backing and should not solely depend on it.

**Guidance for Skills Testing and Examiner Training:** The use of this safety technology feature should be permitted during testing. While backing up, the applicant checks their mirrors and conducts head checks (looking over the shoulders) in conjunction with the use of the back-up warning. Using all methods together will allow the driver to safely monitor and maneuver the vehicle, gain better perception, and see anything the back-up warning is not detecting.

If the back-up warning activates while backing, the examiner must determine if the vehicle is close enough to be a danger (no different than current scoring procedures). The examiner must validate the severity of the situation.



**Considerations for Driver's Manuals:** Driver's manuals should be updated to include back-up warning systems. When the driver shifts into reverse, sensors scan the area behind the vehicle. The back-up warning will alert the driver through sounds, vibration, or both if there is an object behind the vehicle.

The driver should not become complacent and dependent on the back-up warning. The driver should safely monitor and maneuver their vehicle during backing. These include checking:

- side mirrors,
- rear-view mirror,
- over the shoulders (head checks), and
- camera(s), if equipped.

## **Blind spot monitor and warning**



**Description:** Warns the driver of other vehicles driving in their blind spots through display of a symbol, sound, or vibration. They may provide an additional warning if a driver uses their turn signal when there are other vehicles in another lane.

**How It Works:** The blind spot monitor helps the driver be more aware of other traffic. The warnings provided by the blind spot monitor can be helpful to the driver when making a lane change, but the driver should still always check their mirrors and look over their shoulders before doing so.

**Safety Critical Technology:** Blind spot monitors are a “safety critical” technology that may prevent a crash.



**Considerations for Testing:** Applicants should demonstrate all necessary behaviors for safely monitoring and maneuvering their vehicles while changing lanes. These include frequently scanning:

- side mirrors,
- rear-view mirror,
- over the shoulders (head checks), and
- blind spot monitor, if equipped.



Blind spot monitors alone do not demonstrate the applicant’s ability to safely monitor and maneuver the vehicle when changing lanes. Blind spot monitors are intended to provide an additional monitoring resource to mirrors and head checks. Drivers should not become complacent and dependent on blind spot monitors alone for changing lanes.

**Guidance for Skills Testing and Examiner Training:** The use of this safety technology feature should be permitted during testing. Training materials and instruction should be updated to indicate that this safety feature will be permitted for testing. If the blind spot monitor activates, the applicant demonstrates the proper visual search behavior by checking the respective mirror and blind spot if changing lanes. They should recognize that another vehicle is in their blind spot. The device should not be turned off.

The applicant is required to check the appropriate mirror and blind spots (head checks) when changing lanes. Score all lane change activities as standard if the applicant uses their mirrors and head checks.

## *Blind spot monitor and warning (continued)*

If the applicant changes lanes and the blind spot warning activates, the examiner must determine if the vehicle is close enough to be a danger (no different than current scoring procedures). It may also be treated as failure to yield or as an



avoidable incident if applicable. The examiner must validate the severity of the situation.

**Considerations for Driver's Manuals:** Driver's manuals should be updated to include the blind spot monitoring systems, which warn the driver of other vehicles driving in their blind spots through display of a symbol, sound, or vibration. They may provide additional warnings if the driver uses their turn signal when there are other vehicles in another lane. The warnings provided by the blind spot monitor can be activated when making a lane change. The driver should always check their mirrors and look over their shoulders before changing lanes.

The driver should not become complacent and dependent on blind spot monitors alone for changing lanes. These include frequently scanning:

- side mirrors,
- rear-view mirror,
- over the shoulders (head checks), and
- blind spot monitor, if equipped.

## Camera technologies

### Rear camera



**Description:** Helps see objects directly behind the vehicle by showing a wide view behind the vehicle while backing. Some cameras show a wider view than others.

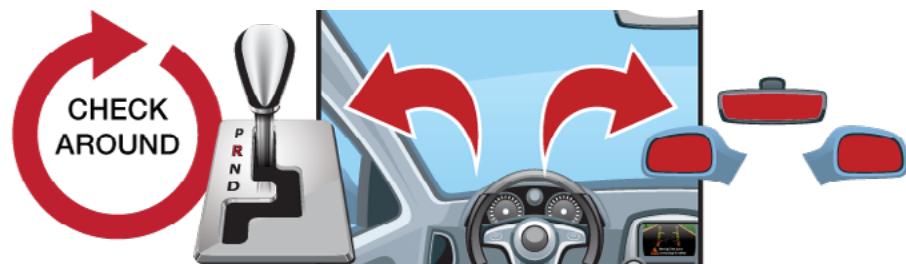


**How It Works:** When the driver shifts into reverse, the rear camera activates to show the area behind the vehicle. Depending on the vehicle, the display screen may be found on the center console, in the rearview mirror, in the sun visor, or in other locations.

**Safety Critical Technology:** Rear cameras are a “safety critical” technology that may prevent a crash.

**Considerations for Testing:** Applicants should demonstrate all necessary behaviors for safely monitoring and maneuvering their vehicle during backing maneuvers. These include checking:

- side mirrors,
- rear-view mirror,
- over the shoulders (head checks), and
- camera(s), if equipped.



The use of rear cameras alone do not demonstrate the applicant’s ability to safely monitor and maneuver the vehicle and their surroundings during backing maneuvers. Rear cameras are intended to provide an additional monitoring resource to mirrors and head checks. Applicants should not become complacent and dependent on rear cameras alone for backing. They should demonstrate the ability to use the camera as part of the backing exercise.

*Camera technologies:  
Rear camera (continued)*

**Guidance for Skills Testing and Examiner Training:** The use of this safety technology feature should be permitted during testing. When backing up, the applicant checks their mirrors and conducts head checks (looking over the shoulders) in conjunction with the rear cameras. Using all methods together will allow the applicant to safely monitor and maneuver their vehicle, gain better perception, and see anything the rear camera is not capturing.



**Considerations for Driver's Manuals:** Driver's manuals should be updated to include rear cameras. When the driver shifts into reverse, the rear camera activates to show the area behind the vehicle. Depending on the vehicle, the display screen may be found on the center console, in the rearview mirror, in the sun visor, or in other locations.

The driver should not become complacent and dependent on rear cameras. The driver must safely monitor and maneuver their vehicle during backing maneuvers. These include checking:

- side mirrors,
- rear-view mirror,
- over the shoulders (head checks), and
- camera(s), if equipped.

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*Sideview camera*



**Description:** Shows the driver an expanded view of a lane beside the vehicle when they use the turn signal or when they activate the feature manually. This feature shares similar uses to blind spot monitors.

**How It Works:** The feature shows the driver a video view of what is next to or coming up alongside the vehicle. They may be used in conjunction with or in place of traditional mirrors. The driver can use the turn signal or activate the feature through a button usually located on the turn signal lever. If the driver wants to use this feature while backing up, it may only turn on if they are at low speeds.



*Camera technologies:  
Sideview camera (continued)*

**Safety Critical Technology:** Sideview cameras are considered a “safety critical” technology that may prevent a crash.

**Considerations for Testing:** Applicants should demonstrate all necessary behaviors for safely scanning and monitoring the driving environment. The use of sideview cameras alone does not demonstrate the applicant’s ability to be aware of their surroundings on the roadway. Sideview cameras should be used in conjunction with traditional mirrors and head checks (checking over the shoulders). Some newer vehicles may be equipped with sideview cameras in place of traditional mirrors. In this case, use of the sideview cameras should be scored the same as checking mirrors.



**Guidance for Skills Testing and Examiner Training:** The use of this safety technology feature should be permitted during testing. If a vehicle is equipped with sideview cameras, the applicant should be evaluated on the use of this feature in conjunction with other driving behaviors. Driver tests may already address the other behaviors, and the test should include behaviors for checking sideview cameras.

Sideview cameras are a safety feature and are replacing mirrors in some vehicles. If a vehicle is not equipped with traditional mirrors, applicants should be evaluated on the use of the cameras similar to checking mirrors.



**Considerations for Driver's Manuals:** Manuals should be updated to include information that sideview cameras show the driver an expanded view of a lane beside the vehicle when the driver uses their turn signal or when the driver activates the feature manually. This feature shares similar uses to blind spot monitors. The feature shows the driver a video view of what is next to or coming up alongside the vehicle. They may be used in conjunction with or in place of traditional mirrors.

Sideview cameras should be used in conjunction with traditional mirrors and head checks (checking over the shoulders). Some newer vehicles may be equipped with sideview cameras in place of traditional mirrors.

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**Surround-view monitor or around-view monitor system**



**Description:** Assists drivers to park more easily by better understanding the vehicle's surroundings through a virtual bird's-eye view from above the vehicle. The around-view monitor helps the driver visually confirm the vehicle's position relative to the lines around parking spaces and adjacent objects, allowing the driver to maneuver into parking spots with more ease.\*

**How It Works:** The around-view monitor processes video from four cameras, displaying the composite footage on the screen as if there is a single birds-eye view camera right above the vehicle. The four wide-angle cameras on the front, back, left, and right are the foundations of the around-view mirror.

Video signals from four cameras feed into an image processing unit – the side views showing both left and right, the rear view showing the back of the vehicle, and a front-view camera. These signals are then converted into a composite virtual bird's-eye top view image as if seen from directly above the vehicle.

**Safety Critical Technology:** Surround-view monitor or around-view monitor systems are considered “safety critical” technologies that may prevent a crash.

**Considerations for Testing:** Applicants should demonstrate all necessary behaviors for safely scanning and monitoring the driving environment. Surround-view monitor or around-view monitor systems alone do not demonstrate the applicant’s ability to be aware of their surroundings on the roadway. Surround-view monitor or around-view monitor systems should be used in conjunction with traditional mirrors and head checks (checking over the shoulders). Some newer vehicles may be equipped with surround-view monitor or around-view monitor systems in place of traditional mirrors. In this case, use of the surround-view monitor or around-view monitor systems should be scored the same as checking mirrors.

**Guidance for Skills Testing and Examiner Training:** The use of this safety technology feature should be permitted during testing. If a vehicle is equipped with surround-view monitor or around-view monitor systems, the applicant should be evaluated on the use of this feature in conjunction with other driving behaviors. Driver tests may already address the other behaviors, and the test should include behaviors for checking surround-view monitor or around-view monitor systems.

Surround-view monitor or around-view monitor systems are a safety feature. If a vehicle is not equipped with traditional mirrors, applicants should be evaluated on the use of the cameras similar to checking mirrors.

**Considerations for Driver's Manuals:** Driver's manuals should be updated to include information that surround-view monitor or around-view monitor systems display a birds-eye view of their car from overhead and show a moving image on their car's display monitor, along with parking lot lane markings,

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\* Nissan Motor Corporation. Around View Monitor. Retrieved from URL <https://www.nissan-global.com/EN/TECHNOLOGY/OVERVIEW/avm.html>.

*Camera technologies:  
Surround-view monitor or  
around-view monitor system  
(continued)*

curbs, and adjacent vehicles. Some systems reinforce the visual information with sonar that warns the driver if the driver is too close to an obstacle, whether it's behind, to the side, or in front. In most vehicles, one camera is in the middle of the front bumper near the front grille. Two more ultra-wide-angle cameras look down from the side view mirrors along the flanks on the car. A fourth may be in the middle of the rear bumper and may be just above the license plate. Software puts the four images together and inserts an image of the vehicle in the middle of the four camera images located so the driver can see it.

Surround-view monitor or around-view monitor systems should be used in conjunction with traditional mirrors and head checks (checking over the shoulders). Some newer vehicles may be equipped with surround-view monitor or around-view monitor systems in place of traditional mirrors.

### Curve speed warning



**Description:** Warns the driver when they are approaching a curve or exit on the road too quickly.

**How It Works:** Tracks the vehicle's speed and location via GPS and warns the driver to slow down when approaching curves and exits.

**Safety Critical Technology:** Curve speed warning is a "safety critical" technology that may prevent a crash.

**Considerations for Testing:** Applicants should demonstrate their ability to maintain a safe speed while driving. The proper response to a curve speed warning alone does not demonstrate the applicant's ability to maintain a safe speed while driving. Applicants should not become complacent and dependent on curve speed warning alone.

**Guidance for Skills Testing and Examiner Training:** The use of this safety technology feature should be permitted during testing. When the applicant is driving, they should maintain a safe speed through curves and exits.

If the curve speed warning activates, the examiner must determine if the vehicle is going too fast through the curve (no different than current scoring procedures). The examiner must validate the severity of the situation.

**Considerations for Driver's Manuals:** Driver's manuals should be updated to include curve speed warnings to help the driver maintain a safe speed when approaching a curve or exit. The vehicle will alert the driver through sound, vibration, or both that they are approaching a curve or exit at an unsafe speed.

The driver should not become complacent and dependent on curve speed warnings. The driver should maintain a safe speed while driving and approaching curves or exits.

## Detection technologies

### Bicycle, pedestrian, and obstacle detection



BICYCLE DETECTION



PEDESTRIAN DETECTION



OBSTACLE DETECTION

**Description:** Alerts drivers when a bicycle, pedestrian, slow-moving or stationary obstacle has been detected when driving at low speeds, generally around 25 mph. Some systems can only detect bicyclists, pedestrians, or obstacles when traveling directly in front of the vehicle and when moving in the same direction. For some versions of obstacle detection, it will apply the vehicle brake automatically.

**How It Works:** Sensors located in the front or rear (or both the front and rear) of the vehicle are able to detect how close the vehicle is to a bicycle, pedestrian, or obstacle in front or in rear. These typically are radar-based. Warnings can come in the form of sounds, visuals, vibrations or a quick brake pulse, or a mix of warnings. The beeps become faster as the vehicle moves closer to the bicycle, pedestrian, or obstacle. A crash is imminent when the beeps become continuous.



**Safety Critical Technology:** Forward collision warnings are a “safety critical” technology that may prevent a crash.

**Considerations for Testing:** Applicants should demonstrate all necessary behaviors for safely scanning and monitoring the driving environment ahead for hazards, including bicyclists, pedestrians, and obstacles. Bicycle, pedestrian, and obstacle detection does not show the applicant’s awareness of the surroundings and ability to check for bicyclists, pedestrians, and obstacles regularly, especially in urban areas.

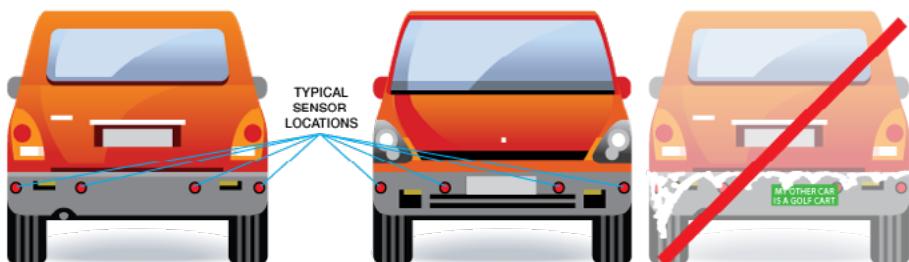
**Guidance for Skills Testing and Examiner Training:** The use of this safety technology feature should be permitted during testing. Applicants should always scan the road and horizon ahead, looking for bicyclists, pedestrians, and obstacles. The applicant should aggressively scan for traffic and other road users ahead and check their mirrors regularly. The obstacle detection feature is not a substitute for visual search or checking mirrors. If the applicant is warned they are approaching a slow-moving or stationary object by the system, they should respond appropriately. If the driver fails to react to the warning, they should be scored as appropriate for the circumstance. Applicants should read the owner’s manual so they understand how they will be warned if the system detects a bicyclist, pedestrian, or obstacle.

*Detection technologies:  
Bicycle, pedestrian, and  
obstacle detection (continued)*



Score an applicant no differently than the current testing process. When the warning device activates, the examiner needs to evaluate the situation. Tests should include evaluation of following distances and when warnings activate. They may also be scored for other applicable behavior. Tests should include scoring the driver's behavior for scanning and recognizing bicyclists, pedestrians, other road users, or obstacles in advance so as not to have the bicycle, pedestrian, or obstacle detection activate. These behaviors may already be addressed in the testing system, and warnings may provide assistance to examiners in monitoring the applicant.

In some situations, if a person walks in front of it or behind it while the vehicle is stopped, the alert may sound. The applicant should not be scored for an improper behavior in this situation.



**Considerations for Driver's Manuals:** Driver's manuals should be updated to include information that bicycle, pedestrian, and obstacle detection alerts the driver or automatically brakes if there is a bicyclist, pedestrian, or obstacle in the path between a certain speed range, generally around 25 mph, and uses advanced sensors to detect human, slow-moving, or stationary movements ahead and alerts the driver. Some obstacle detection systems may automatically apply the brakes.

Drivers should read the owner's manual so they understand how they will be warned if the system detects a bicyclist, pedestrian, or obstacle.

The driver should not depend on bicycle, pedestrian, or obstacle detection. The driver should be aware of their surroundings and check for bicyclists, pedestrians, or obstacles regularly, especially in urban areas.

The driver may be alerted by beeps or the dashboard display. The beeps may become faster as the vehicle moves closer to the obstacle. A collision may be imminent when the beeps become continuous.

## Forward collision warning systems



**Description:** Alerts drivers of an impending collision with a slower moving or stationary vehicle or object to the front so a driver can brake or swerve in time. The warning alone will not automatically brake for the driver. Forward collision warning scans the road ahead while driving.

**How It Works:** Sensors located in the front of the vehicle are able to detect how close the vehicle is to other vehicles in front. These typically are camera or radar-based. It is intended to warn the driver when they are getting dangerously close to the vehicle or object in front. Warnings can come in the form of sounds, visuals, vibrations or a quick brake pulse, or a mix of warnings. The forward collision warning system scans the traffic ahead 20 times per second up to 500 feet in front of the driver and then warns the driver to brake or steer if a hazard is in their path. As an example, here are three levels of alerts\*:

Speed	Warning Time Before a Collision
15–18 mph	3 seconds
18–50 mph	4 seconds
50+ mph	5 seconds



**Safety Critical Technology:** Forward collision warning systems are a “safety critical” technology that may prevent a crash.

**Considerations for Testing:** Applicants should demonstrate all necessary behaviors for safely scanning and monitoring the driving environment ahead for hazards. Forward collision warning systems do not demonstrate the applicant’s



\* Safe Drive Systems. <https://safedrivesystems.com/forward-collision-warning/>

## *Forward collision warning systems (continued)*

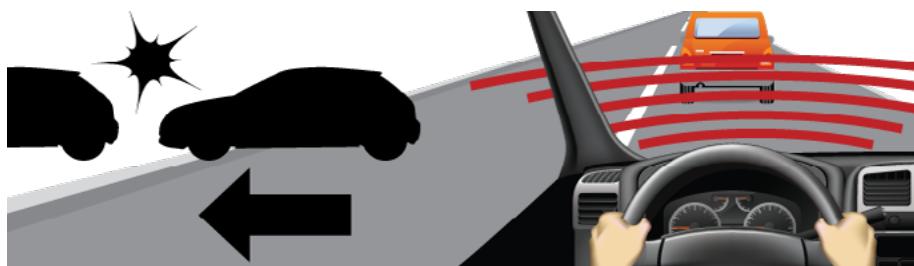
ability to properly control the vehicle on the roadway and maintain a safe following distance.

**Guidance for Skills Testing and Examiner Training:** The use of this safety technology feature should be permitted during testing. As the applicant is driving, they should always be cautious, check traffic regularly, and keep a safe following distance from the vehicles ahead. However, if they do unintentionally get too close to another vehicle, the warning may alert the driver so they can brake or steer away quickly.

Score an applicant no differently than the current testing process. When the warning device activates, the examiner needs to evaluate the situation. Tests should include evaluation of following distances and when warnings activate.

The warning may also alert the applicant to an object or vehicle suddenly entering the path of travel. In this action, the applicant may not have made a behavioral error; thus, the applicant should not be penalized.

If the forward collision warning system activates, the applicant should demonstrate the proper behavior by braking or steering quickly. They should recognize that another vehicle or object is in their travel path. If they do not perform the behavior correctly, the applicant should be scored for not doing so.



**Considerations for Driver's Manuals:** Driver's manuals should be updated to include forward collision warning systems which alerts the driver of an impending collision with a slower moving or stationary vehicle to the front so the driver can brake or swerve in time. It will not automatically brake for the driver. Forward collision warning scans the road ahead while driving.

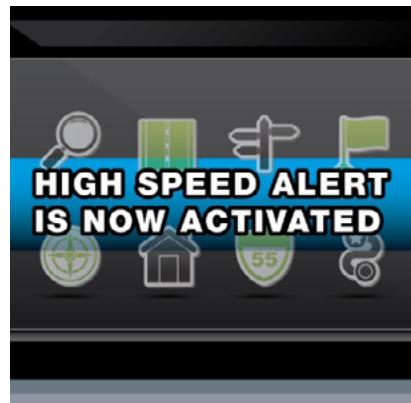
The driver should always be cautious, check traffic regularly, and keep a safe following distance. If they do unintentionally get too close to another vehicle, the forward collision warning system will brake or steer quickly.

## High speed alert



**Description:** An alert that sounds if the driver is speeding. This helps drivers maintain a safe driving speed.

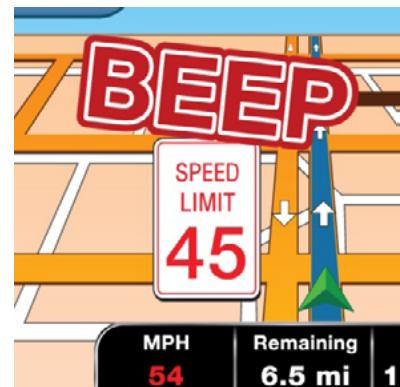
**How It Works:** The GPS or car's infotainment center must be up to date to ensure the posted speed is known. If the posted speed is exceeded, the alert will activate as beeps or visual warnings such as color changes on the display or a flashing speed limit sign. If a warning sounds, the driver should carefully slow the car to the appropriate posted speed limit by releasing the accelerator or lightly braking. The driver should refrain from slamming the brakes to maintain a safe speed.



**Safety Critical Technology:** High speed alert technology is a “safety critical” technology that may prevent a crash.

**Considerations for Testing:** Applicants should demonstrate all necessary behaviors for safely monitoring their speed. High speed alert warning systems do not demonstrate the applicant’s ability to maintain a safe speed and obey the speed limit on the roadway.

**Guidance for Skills Testing and Examiner Training:** The use of this safety technology feature should be permitted during testing. As the applicant is driving, they should always maintain a safe speed and obey the speed limit by occasionally looking at the speedometer. If the applicant is warned they are speeding, they should carefully slow the car to the appropriate posted speed limit by releasing the accelerator or lightly braking. They should refrain from slamming the brakes to maintain a safe speed.



If the device activates, verify the applicant’s speed and score the applicant for speeding, if applicable (e.g., over 5 mph). Observe the applicant to ensure



## *High speed alert (continued)*

they reduce speed properly. Tests should include scoring the driver's behavior when speeding and proper procedures for reducing speed. These behaviors may already be addressed in the testing system, and warnings may provide assistance to examiners in monitoring the applicant's speed.

**Considerations for Driver's Manuals:** Driver's manuals should be updated to include a high speed alert sounds if the driver is speeding. This helps the driver maintain a safe driving speed. First, make sure the GPS or car's infotainment center is fully up to date. Then listen or look for high speed alerts, such as beeps or visual warnings such as color changes on the display. If a warning sounds, carefully slow the car to the appropriate posted speed limit by releasing the accelerator or lightly braking. Refrain from slamming the brakes to maintain a safe speed.

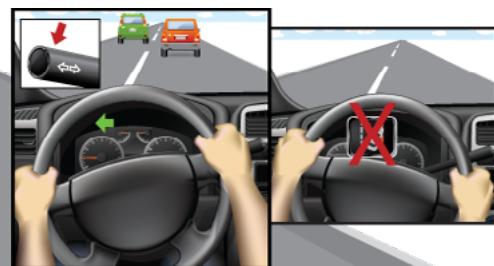
The driver should not rely on the high speed alert. The driver should safely monitor their speed, maintain a safe speed, and obey the speed limit on the roadway.

## *Lane departure warning device*



**Description:** Alerts a driver when they are drifting out of their lane using visual, vibration, or sound warnings. This feature can help alert a driver to steer back to the center of their lane if they mistakenly drift, helping to prevent a crash.

**How It Works:** This feature relies on roadway markings to operate. It's designed to alert the driver if the car begins to drift out of a lane with one or more types of warnings.



**Safety Critical Technology:** Lane departure warning device systems are a "safety critical" technology that may prevent a crash.

**Considerations for Testing:** Applicants should demonstrate all necessary behaviors for maintaining their lane position. Lane-departure warning device systems do not demonstrate the applicant's ability to control the vehicle on

### *Lane departure warning device (continued)*

the roadway and remain in the lane. The applicant should demonstrate proper visual lead and steering control to stay within their lane of travel.

**Guidance for Skills Testing and Examiner Training:** The use of this safety technology feature should be permitted during testing. As the applicant is driving, they should always be aware of their surroundings and the traffic in the lanes around them. The applicant should check traffic and their mirrors regularly. They should stay within their lane of travel. If they unintentionally begin to drift out of the lane, this feature should alert them and they should reposition the vehicle within the lane.

When the warning device activates, score the applicant for lane or lane lines only if the applicant crosses a lane marking. Examiner scoring should not be based on the audible indicator. The examiner should observe the proximity of the vehicle to lane lines to determine if the applicant has crossed or touched the lane line. This is similar to current scoring practices. Tests should include scoring the applicant's behavior when keeping the vehicle within lane lines. These behaviors may already be addressed in the testing system, and warnings may provide assistance to examiners in monitoring the applicant's lane position.



**Considerations for Driver's Manuals:** Driver's manuals should be updated to include information that lane departure warning device alerts the driver by using visual, vibration, or sound warnings when the driver is drifting out of their lane. This feature can alert the driver to correct their lane position. This feature relies on roadway markings to operate.

The driver should not rely on lane departure warning devices. The driver should demonstrate all necessary behaviors for maintaining correct lane position.

## Parking sensors



**Description:** Alert the driver to the position of objects around the vehicle as they park. Listen for the rate of the warning sounds; a constant tone means the vehicle is close to an object.

**How It Works:** The vehicle may provide audible warnings that there are objects in front or behind it. The intervals between beeps may become shorter the closer the vehicle is to an object.



**Safety Critical Technology:** Parking sensors are considered a “safety critical” technology that may prevent a crash.

**Considerations for Testing:** Applicants should demonstrate all necessary behaviors for safely parking their vehicle. These include checking:

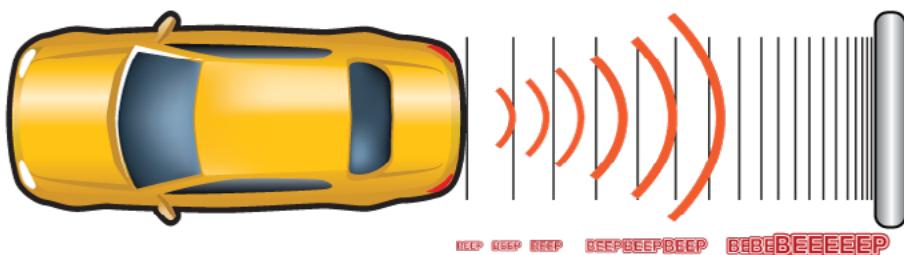
- side mirrors,
- rear-view mirror,
- over the shoulders (head checks), and
- camera(s), if equipped.

Parking sensors alone do not demonstrate the basic skills to park a vehicle correctly or safely within the parking space.

**Guidance for Skills Testing and Examiner Training:** The use of this safety technology feature should be permitted during testing. Applicants should not rely solely on parking sensors to detect all objects in their parking path. They may not detect objects that are flat on the ground, below the bumper, too close to the vehicle, or too far from it. Applicants should remain aware of their surroundings through use of mirrors, head checks, and rear cameras while parking, including awareness of people or objects that may enter the parking path. The sensors may not be able to be deactivated, and applicants should be permitted to use the sensors, in addition to using the mirrors, head checks, and rear cameras while backing.

If the parking sensor activates while parking, the examiner must determine if the vehicle is close enough to be a danger (no different than current scoring procedures). The examiner must validate the severity of the situation.

## Parking sensors (continued)



**Considerations for Driver's Manuals:** Driver's manuals should be updated to include parking sensors alert the driver to the position of objects around the vehicle as the driver parks. Listen for the rate of the warning sounds; a constant tone means the vehicle is close to an object. The vehicle may provide audible warnings that there are objects in front or behind it. The intervals between beeps may become shorter the closer the vehicle is to an object.

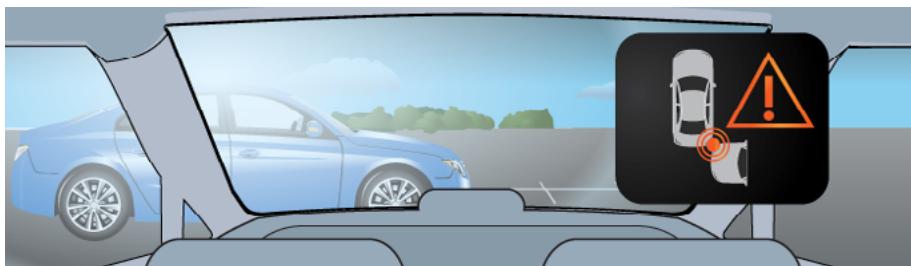
The driver should not rely solely on parking sensors to detect all objects. They may not detect objects that are flat on the ground, below the bumper, too close to the vehicle, or too far from it. The driver must remain aware of their surroundings through use of mirrors, head checks, and rear cameras while parking, including awareness of people or objects that may enter the parking path.

## Rear cross-traffic alert



**Description:** Warns the driver if one or more vehicles are about to enter the backing path. Can detect vehicles that might be crossing during backing.

**How It Works:** Sensors around the rear of the vehicle detect other vehicles approaching from the left and right. The driver may be alerted by a warning tone or flashing lights on the mirrors or dashboard alerting the driver to stop.



**Safety Critical Technology:** Rear cross-traffic alert is considered a “safety critical” technology that may prevent a crash.

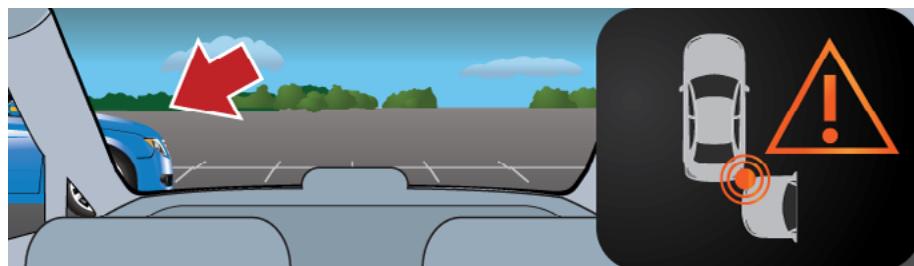
**Considerations for Testing:** Applicants should demonstrate all necessary behaviors for safely scanning and monitoring the driving environment to the rear of the vehicle. Relying on rear cross-traffic alert alone does not demonstrate the applicant's ability to safely monitor the surrounding area while backing the vehicle.

## Rear cross-traffic alert (continued)

**Guidance for Skills Testing and Examiner Training:** The use of this safety technology feature should be permitted during testing. The applicant should physically check behind the vehicle before backing out of a driveway or parking spot. There are some objects that rear cross-traffic alert sensors may not detect, especially if they are located partially under the vehicle. Applicants should remain aware of their surroundings through use of mirrors, head checks, and rear cameras while backing or parking, including awareness of vehicles that may enter the path. Applicants should be permitted to use the sensors, in addition to exhibiting behaviors for utilizing the mirrors, head checks, and rear cameras while backing.

It should be noted that the vehicle may be stopped, and if a vehicle passes behind the vehicle, the alert may sound. The applicant should not be scored for an improper behavior in this situation.

Score an applicant no differently than the current testing process. When the warning device activates, the examiner needs to evaluate the situation.



**Considerations for Driver's Manuals:** Driver's manuals should be updated to include information that rear cross-traffic alert warns the driver if one or more vehicles are about to enter the backing path. It can detect vehicles that might be crossing during backing. Sensors around the rear of the vehicle detect other vehicles approaching from the left and right. A warning tone and flashing light on the mirrors or dashboard may alert the driver to stop.

The driver should not depend on the rear cross-traffic alert. The driver should safely scan and monitor the driving environment to the rear of the vehicle.



## Section Two Driver Assistance Systems Technologies

The primary purpose of these technologies is to perform a component of the driving function in specific circumstances. Vehicle assistance systems technologies assist drivers in avoiding hazards and crashes. Some automatically make adjustments to the vehicle, and some assist the driver in making adjustments, such as braking or steering. The driver may still need to make changes to the operation of the vehicle to prevent a problem or crash, but the vehicle assists.

It should be noted that the vehicle technologies may respond quicker than a human can react if another vehicle or object appears suddenly in front of the applicant's vehicle without any warning. In this case, the examiner will have to use their discretion to determine if the applicant should be scored for not reacting before the automatic action occurs.

### Driver Assistance Systems – Safety Critical Technologies

The following technologies may prevent or reduce the severity of a crash. These technologies are permissible and should not be disengaged during the testing process.

#### *Automatic emergency braking systems or brake assist*

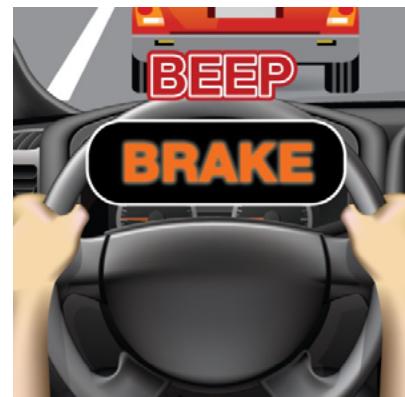


**Description:** Can sense slow or stopped traffic or an object ahead and urgently applies the brakes if the driver fails to respond.

**How It Works:** If the driver fails to brake or steer to avoid a hazard ahead, the vehicle will slow down rapidly or stop on its own to avoid a crash. Drivers should continue to scan the road for hazards and maintain a safe following distance.

**Safety Critical Technology:** Automatic emergency braking or brake assist is considered a "safety critical" technology.

**Considerations for Testing:** Applicants should demonstrate all necessary behaviors for appropriate speed and space management. Automatic emergency braking systems do not demonstrate the applicant's ability to be aware of their surroundings and vehicles ahead on the roadway. They should be able to identify hazards in time and begin slowing or stopping the vehicle in a timely manner to avoid striking hazards.



*Automatic emergency braking systems or brake assist  
(continued)*



**Guidance for Skills Testing and Examiner Training:** The use of this safety technology feature should be permitted during testing. Training materials and instruction should be updated to indicate this is a safety feature and applicants should not deactivate this feature.

If the applicant fails to identify a hazard and therefore fails to reduce speed or stop appropriately, they should be scored for not doing so.

When automatic emergency braking systems or brake assist device activates, you may choose to score the applicant for:

- not scanning or did not identify hazard(s),
- following distance,
- not yielding,
- lack of vehicle control, or
- other behavior.

It should be noted that the automatic emergency braking may respond quicker than a human can react if another vehicle or object appears suddenly in front of the applicant's vehicle without any warning. In this case, the examiner will have to use their discretion to determine if the applicant should be scored for not stopping before the automatic braking activated.



**Considerations for Driver's Manuals:** Driver's manuals should be updated to include that automatic emergency braking systems can sense slow or stopped traffic or an object ahead and urgently apply the brakes if the driver fails to respond. If the driver fails to brake or steer to avoid a hazard ahead, the vehicle will slow down rapidly or stop on its own to avoid a crash. The driver should continue to scan the road for hazards and maintain a safe following distance. The driver should be sure to clear any build-up on the vehicle's sensors.

## *Automatic reverse braking*



**Description:** Can apply the brakes if an obstacle is detected while reversing the vehicle. Helps the driver avoid a possible crash when the vehicle is moving in reverse.

**How It Works:** While backing up, if an object is detected, the driver may hear a series of beeps or see visual indicators to alert them an object is to the rear. If the driver does not react, the reverse automatic brake activates, and the brakes are immediately applied to help avoid a potential crash.

**Safety Critical Technology:** Automatic reverse braking is considered a “safety critical” technology.

**Considerations for Testing:** Applicants should demonstrate all necessary behaviors for safely backing their vehicle. Automatic reverse braking systems do not demonstrate the applicant’s ability to be aware of their surroundings and hazards to the rear of them on the roadway.

**Guidance for Skills Testing and Examiner Training:** The use of this safety technology feature should be permitted during testing. If the applicant fails to identify a hazard while backing and the automatic reverse backing activates, the applicant should be scored for not recognizing the hazard. The applicant should be required to check mirrors, check over the shoulder (head checks), and use backing cameras if equipped.

It should be noted that the automatic emergency braking may respond quicker than a human can react if another vehicle or object appears suddenly behind the applicant’s vehicle without any warning. In this case, the examiner will have to use their discretion to determine if the applicant should be scored for not stopping before the automatic braking activates.

The applicant should be required to check mirrors, check over the shoulder (head checks), and use backing cameras if equipped.

**Considerations for Driver’s Manuals:** Driver’s manuals should be updated to include that automatic reverse braking can apply the brakes if an obstacle is detected while reversing the vehicle. It helps the driver avoid a possible crash when the vehicle is moving in reverse. While backing up, if an object is detected, you will hear a series of beeps and see visual indicators to alert the driver an object is to the rear. If the driver does not react, the reverse automatic brake activates, and the brakes are immediately applied to help avoid a potential crash.

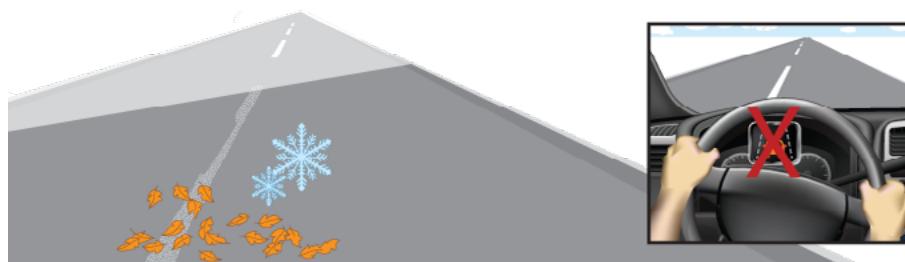
The driver should not depend on the automatic reverse braking technology. The driver is required to check mirrors, check over the shoulder (head checks), and use backing cameras if equipped.

## Lane keeping assist



**Description:** This feature can help return you to your lane if you drift out. This could help prevent a crash.

**How It Works:** Works to keep the driver in their lane. The driver may receive an alert via a sound, flashing light, or vibration if the vehicle drifts out of the lane. The driver should return to their lane; if they don't take action, this feature may gently steer the driver into their lane. It is easily cancelled by nudging the wheel. This feature will not work when lane lines are faint or covered with snow or dirt.



**Safety Critical Technology:** Lane keeping assist is considered a “safety critical” technology.

**Considerations for Testing:** Applicants should demonstrate all necessary behaviors for maintaining their lane position. Lane keeping assist devices do not demonstrate the applicant’s ability to maintain control of the vehicle on the roadway and remain within the driving lane. The applicant should demonstrate proper visual lead and steering control to maintain their vehicle within the travel lane.

**Guidance for Skills Testing and Examiner Training:** The use of this safety technology feature should be permitted during testing. As the applicant is driving, they should always be aware of their surroundings and the traffic in the lanes around them. The applicant should check traffic and their mirrors regularly. They should be able to position and maintain their vehicle within the travel lane unless turning or changing lanes. However, if they do unintentionally begin to drift out of the lane, the lane keeping assist will return them within the lane.

When the lane keeping assist device activates, score the applicant for lane or lane lines if the applicant crosses a lane marking. Examiner scoring should not be based on an audible or visual indicator. The examiner should observe the proximity of the vehicle to lane lines to determine if the applicant has crossed or touched the lane line. This is similar to current scoring practices. These behaviors may already be addressed in the testing system, and warnings may provide assistance to examiners in monitoring the applicant’s lane position.

### *Lane keeping assist (continued)*

They should be able to position and maintain their vehicle within the travel lane unless turning or changing lanes. If they do unintentionally begin to drift out of the lane, lane keeping assist will return them within the lane.



**Considerations for Driver's Manuals:** Driver's manuals should be updated to include information that lane keeping assist helps the driver return to their lane if the driver drifts. This technology could help prevent a crash. Lane keeping assist works to keep the driver in their lane. The driver may receive an alert via a sound, flashing light, or vibration if the vehicle drifts out of the lane. The driver should return to their lane; if the driver doesn't take action, this feature may gently steer the driver back to the center of the lane. It is easily cancelled by nudging the wheel.

The driver should not depend on lane keeping assist. The driver should maintain control of the vehicle on the roadway at all times and remain within the driving lane.

### *Left turn crash avoidance*



**Description:** This feature monitors traffic when the driver turns left across traffic at low speeds (such as at a traffic light). It activates warning sounds and dash lights and automatically applies the brake if a driver is turning left into the path of another vehicle.

**How It Works:** The left turn assist system monitors oncoming traffic when the driver initiates a turn maneuver across the opposite driving lane at low speeds. If the gap in traffic is too small to permit a turn, the system prevents the vehicle from moving forward.

If a crash with an oncoming vehicle is imminent, the system will stop the turning maneuver in time by initiating an automatic emergency braking maneuver.

**Safety Critical Technology:** Left turn crash avoidance is considered a “safety critical” technology that may prevent a crash.

**Considerations for Testing:** Applicants should demonstrate all necessary behaviors for safely scanning and monitoring the driving environment ahead for hazards and selecting a safe gap to turn. Left turn crash avoidance devices

*Left turn crash avoidance  
(continued)*

do not demonstrate the applicant's ability to see oncoming traffic and stop, if necessary, for oncoming traffic while turning. Applicants should demonstrate the skills for monitoring traffic ahead and to determine when it is safe to turn in front of other traffic.

**Guidance for Skills Testing and Examiner Training:** The use of this safety technology feature should be permitted during testing.

If the applicant fails to identify a hazard and therefore fails to stop appropriately for traffic, they should be scored for not doing so.

When left turn crash avoidance activates you may choose to score the applicant for:

- not scanning or did not identify hazard(s),
- not yielding,
- lack of vehicle control,
- unsafe act, or
- other behavior.

**Considerations for Driver's Manuals:** Driver's manuals should be updated to include information that left turn crash avoidance monitors traffic when turning left across traffic at low speeds such as at a traffic light. It activates warning sounds or dash lights and automatically applies the brake if the driver is turning left into the path of another vehicle. The left turn assist system monitors oncoming traffic when the driver initiates a turn maneuver across the opposite driving lane at low speeds. If the gap in traffic is too small to permit a turn, the system prevents the driver from moving forward. If a crash with an oncoming vehicle is imminent, the system will stop the turning maneuver in time by initiating an automatic emergency braking maneuver.

The driver should not depend on left turn crash avoidance. The driver should safely scan and monitor the driving environment ahead for hazards and determine when it is safe to turn in front of other traffic.

## Driver Assistance Systems – Convenience Technologies

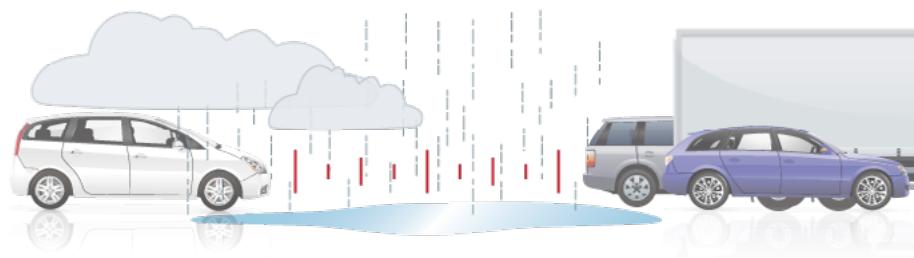
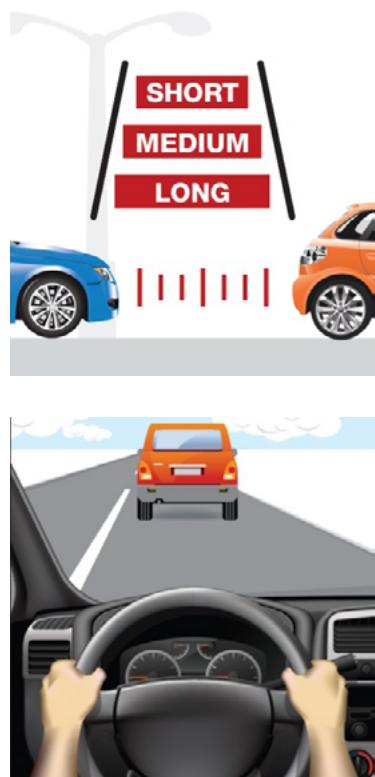
The following technologies provide conveniences for the driver and do not require the applicant to demonstrate a required skill set. Convenience technologies should not be permitted for use during the testing process.

### Adaptive cruise control



**Description:** Can increase or decrease the vehicle's speed to maintain a following distance set by the driver. Advanced versions can even slow and stop the vehicle in traffic jams and then accelerate automatically.

**How It Works:** The driver accelerates to their set speed, and then turns on the adaptive cruise control (ACC). They can then tell the ACC how close they want their following distance gap to be (generally short, medium, or long distances), and it is then set to begin working. Sensors on the vehicle read the road ahead for traffic. However, the driver is required to remain aware of their surroundings. In bad weather and other unsafe driving conditions, it is advised not to use ACC. In driver education and driver manuals, a 3- to 4-second following distance is used.



**Convenience Technology:** Adaptive cruise control is considered a “convenience” technology.

**Considerations for Testing:** Applicants should demonstrate all necessary behaviors for safely controlling vehicle speed. Adaptive cruise control does not demonstrate the applicant's ability to control the speed of the vehicle and therefore should not be permitted for use during testing.

**Guidance for Skills Testing and Examiner Training:** The use of this convenience technology feature should not be permitted during testing. If the applicant attempts to use the technology, the driver should ask them to turn it off.

**Considerations for Driver's Manuals:** Driver's manuals should be updated to include that adaptive cruise control can increase or decrease their speed to maintain a following distance the driver set. Advanced versions can even slow and stop the vehicle in traffic jams and then accelerate automatically. A driver should accelerate to their set speed and turn on the ACC. The driver can tell the ACC how close the driver wants their following distance gap to be (generally short, medium, or long distances), and it is then set to begin working. Sensors on the vehicle read the road ahead for traffic. However, the driver is required to remain aware of their surroundings. In bad weather and other unsafe driving conditions, it is advised not to use ACC.

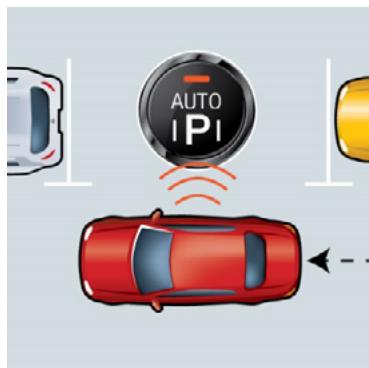
### **Automatic parallel parking**



**Description:** Helps guide the driver into a parallel parking spot after searching and may find a viable option. The driver is still responsible for braking and monitoring the environment.

#### **How It Works:**

- The driver can activate the vehicle's automatic parallel parking sensors when ready to park.
- The vehicle's automatic parallel parking system will inform the driver when it has found an appropriate spot to park.
- The driver should follow any prompts provided by the vehicle's automatic parallel parking feature. These may include pulling in front of the space, shifting into reverse, and taking hands off the steering wheel. The driver is responsible for braking.
- After the vehicle is parked, the driver may need to do some slight adjustments to ensure the vehicle is in an optimal position.

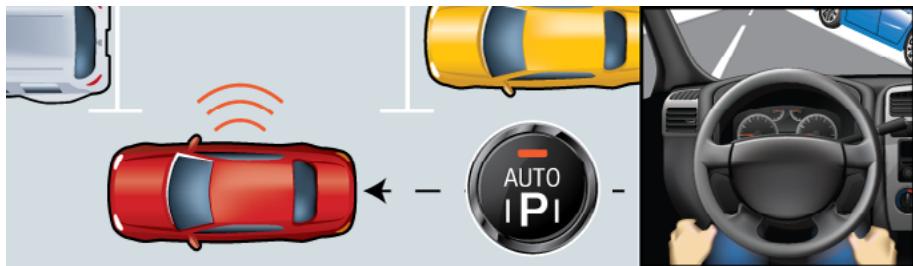


**Convenience Technology:** Automatic parallel parking is a "convenience" technology.

**Considerations for Testing:** Applicants should demonstrate all necessary behaviors for safely parking the vehicle. Automatic parallel parking does not

## *Automatic parallel parking (continued)*

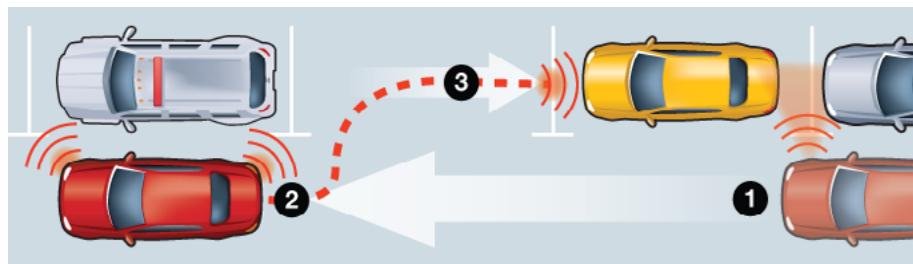
demonstrate the applicant's basic skills to parallel park a vehicle correctly in the parking space.



**Guidance for Skills Testing and Examiner Training:** The use of this convenience technology feature should not be permitted during testing. An applicant should fully demonstrate the basic skills for parallel parking a vehicle.

Training materials and instruction should be updated to indicate automatic parallel parking should not be permitted for use during testing.

**Considerations for Driver's Manuals:** Automatic parallel parking helps guide the driver into a parallel parking spot after searching and may find a viable option. The driver is still responsible for braking and monitoring the environment. The driver can activate the vehicle's automatic parallel parking sensors when ready to park. The vehicle's automatic parallel parking system will inform the driver when it has found an appropriate spot to park. The driver should follow any prompts provided by the vehicle's automatic parallel parking feature. These may include pulling in front of the space, shifting into reverse, and taking hands off the steering wheel. The driver is responsible for braking. After the vehicle is parked, the driver may need to do some slight adjustments to ensure the vehicle is in an optimal position.



## Section Three Conclusions

This document provided guidance for driver testing related to vehicle technologies and whether they should be permitted during the testing process. Safety critical technologies should be permitted for testing, and convenience technologies should not. Table 1 provides a list of vehicle technologies and if they are or are not recommended for use during testing. All

driver assist systems, with the exception of adaptive cruise control and automatic parallel parking, should be permitted for testing.

The universal considerations described on [page 6](#) should be applied to each of the ADAS technologies for driver testing and examiner training.

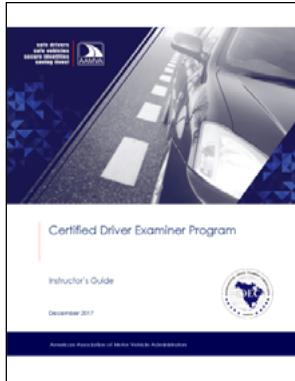
**Table 1 – Vehicle Technologies Permitted and Not Permitted for Testing**

Warning Systems	Page #	Permitted for Testing
<b>Safety Critical Technologies</b>		
Back-up warning	<a href="#">7</a>	Yes
Blind spot monitor and warning	<a href="#">9</a>	Yes
Camera technologies (rear, sideview, surround view)	<a href="#">11</a>	Yes
Curve speed warning	<a href="#">15</a>	Yes
Detection technologies (bicycle, pedestrian, and obstacle detection)	<a href="#">16</a>	Yes
Forward collision warning systems	<a href="#">18</a>	Yes
High speed alert	<a href="#">20</a>	Yes
Lane departure warning device	<a href="#">21</a>	Yes
Parking sensors	<a href="#">23</a>	Yes
Rear cross-traffic alert	<a href="#">24</a>	Yes
Assist Systems	Page #	Permitted for Testing
<b>Safety Critical Technologies</b>		
Automatic emergency braking systems or brake assist	<a href="#">26</a>	Yes
Automatic reverse braking	<a href="#">28</a>	Yes
Lane keeping assist	<a href="#">29</a>	Yes
Left turn crash avoidance	<a href="#">30</a>	Yes
<b>Convenience Technologies</b>		
Adaptive cruise control	<a href="#">32</a>	No
Automatic parallel parking	<a href="#">33</a>	No

# Next Steps

To assist jurisdictions in meeting the changing needs of driver testing related to vehicle technology, AAMVA will:

- Publish an update of the AAMVA *Jurisdictional Guidance for the Safe Testing and Deployment of Highly Automated Vehicles* in late 2019 or early 2020.
- Update the AAMVA NMDTS, including the model:
  - Driver's Manual,
  - Knowledge Test Item Pool,
  - Skills Tests, and
  - Examiner's Manual.



- Update the CDL Testing Materials as appropriate. This may include updates to the CDL:
  - Driver's Manual,
  - Knowledge Test Item Pool,
  - Skills Tests, and
  - Examiner's Manual.
- Update the AAMVA IDEC CDE and CCE training materials and resources.
- Provide updates to this document on an annual basis.

Jurisdictions will be able to use these materials to enhance their driver testing and examiner training programs.

# Acknowledgements



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## **OUR VISION**

*Safe drivers  
Safe vehicles  
Secure identities  
Saving lives!*



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