

Driver Assistance and Vehicle Automation

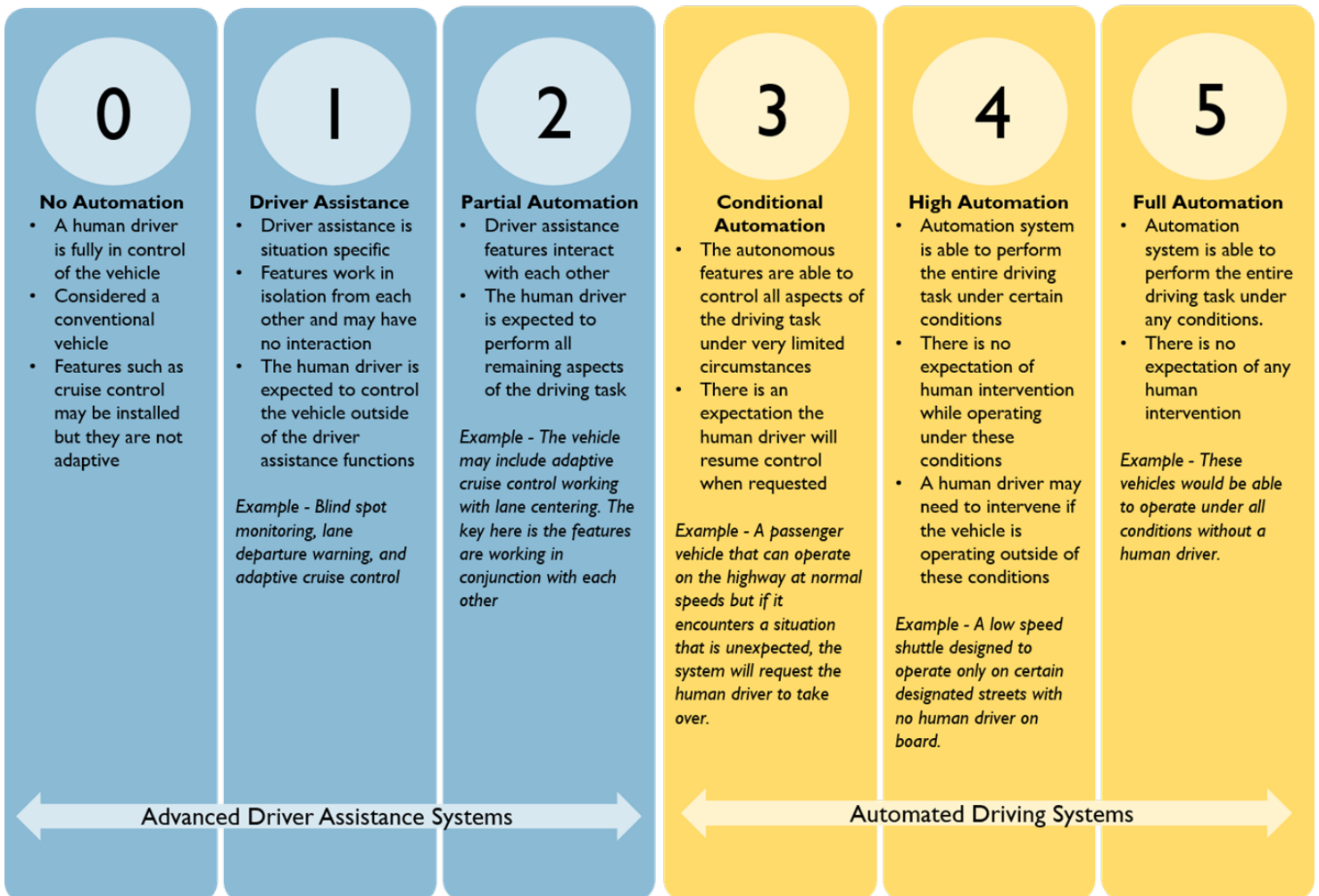
Introduction

The purpose of this document is to provide guidance on the distinction between Automated Driving Systems (ADS) and Advanced Driver Assistance Systems (ADAS). Both types of systems are becoming more commonplace in vehicles, and in many cases are included in vehicle base models. This document will focus on the use of such technology on Nebraska's roads and will provide guidance on which features may require deactivation prior to taking a driver's test.

What are Automated Driving Systems?

There are six levels of automation, a breakdown and example of each can be seen on the chart below. ADS begin at level three and higher. In the chart below, Advanced Driver Assistance Systems (ADAS) are present in levels zero through two, while Automated Driving Systems are present in levels three through five.

Levels of Vehicle Automation



While level five vehicles are still in development, many companies are currently testing vehicles with level three and four capabilities. These vehicles will become more commonplace on our roads over the next 10-20 years.

The significant difference which sets levels three through five vehicles apart from those at lower levels, is the ability of the vehicle to control the entire driving task, even if it is only under a very specific set of circumstances. For example, a vehicle that is able to unilaterally decide when to adjust speed, change lanes, and come to a halt when a system fails would be considered an ADS; however, a car with one or two of those features on their own would not rise to the standard of an ADS. The easiest way to differentiate an ADS equipped vehicle is deciding whether a human or the system is monitoring the surrounding area, and making decisions as to the driving functions.

Driver Requirements

- If a human driver is also present in the vehicle, the person must hold a valid, appropriate driver's license, and be ready to assume control of the vehicle if required.
- No permit or permission is required by the State of Nebraska to operate an ADS equipped vehicle on Nebraska's roads; however, proof of financial responsibility must be provided to the Nebraska Department of Motor Vehicles, or County Treasurer office i.e. proof of insurance or proof of self-insurance.
- Passengers may be transported with no driver if the vehicle is capable of performing the entire dynamic driving task without driver intervention.
- An ADS equipped vehicle may not be used to take a driver's test, unless the automated system has been disabled.

Vehicle Requirements

- Should your ADS equipped vehicle be involved in a road traffic incident, the vehicle or driver must come to a stop and furnish information to a peace officer.
- The vehicle may operate without a driver if
 - It is capable of achieving a minimal risk condition if a malfunction occurs e.g. the vehicle can safely bring itself to a complete halt and activating hazard lamps without driver intervention; and,
 - The vehicle must comply with all applicable traffic and motor vehicle safety laws and regulations of the state that govern the dynamic driving task.*
- Current legislation does not prevent the platooning of vehicles in Nebraska; however, Nebraska Revised Statute 60-6,140 does not exempt platooning vehicles from restrictions on following too closely (currently 100 feet is required).
- Should your vehicle not comply with federal motor vehicle safety standards (includes steering wheel, pedals, etc.), an exemption from the National Highway Traffic Safety Administration (NHTSA) will be required before the vehicle can be registered.

**Please note: the dynamic driving task refers to all real-time operational and tactical functions required to operate a motor vehicle within its specific operational design domain. The operational design domain is the specific conditions, such as geographic location, roadway types, speed ranges, environmental conditions, etc. under which the ADS equipped vehicle is designed to operate. Definitions can be found in Nebraska Revised Statute 60-3301.*

Advanced Driver Assistance Systems

What are Advanced Driver Assistance Systems?

There are two type of ADAS technology:

- Convenience technologies, such as parking assist, or auto-cruise control, which do not allow a driver's test applicant to demonstrate a required skill set.
- Safety critical technologies are those that may prevent or reduce the severity of a crash, and may include rear cameras, alerts, lane departure warning, or emergency braking assist.

Driver & Vehicle Considerations

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).

Where 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.

Driving Test Considerations

Safety critical technologies are typically allowed during a driver's test. This technology may prevent a crash or reduce the severity of a crash. During testing, applicants must still demonstrate all necessary behaviors to ensure a safe driving experience. Convenience technologies assist the driver but are not critical to the safety of road users.

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. 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.

When scoring a skills test, examiner discretion may be used if the safety feature activates when the applicant has done nothing wrong. Examiners will base their decisions on the outcomes of the test and score on the actions of the applicant, not the vehicle. For example, 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.

While new technologies are being released all the time, the table below provides a general overview of some of common features and their use on a drive test.

ADAS Examples

Technology

- BLIND SPOT MONITOR AND WARNING
- BACK-UP WARNING
- CAMERAS (REAR, SIDE, & SURROUND)
- OBSTACLE DETECTION (BICYCLE, PEDESTRIAN)
- FORWARD COLLISION WARNING SYSTEMS
- LANE DEPARTURE WARNING
- REAR CROSS-TRAFFIC ALERT
- EMERGENCY BRAKING SYSTEMS
- LANE KEEPING ASSIST
- ADAPTIVE CRUISE CONTROL
- AUTOMATIC PARALLEL PARKING

What does it do?

- WARNS OF OTHER VEHICLES IN THE BLIND SPOT
- ALERTS OF OBSTACLES BEHIND THE VEHICLE
- ALLOWS DRIVER TO SEE BEHIND THEM
- ALERTS DRIVER TO A NEARBY OBSTACLE
- ALERTS DRIVER TO AN IMPENDING COLLISION
- ALERTS THE DRIVER IF THEY DRIFT OUT OF THEIR LANE
- WARNS THE DRIVER IF A VEHICLE MAY ENTER THE REVERSING PATH
- APPLIES BRAKES IN IMPENDING COLLISION
- HELPS RETURN VEHICLE TO LANE IF THE VEHICLE DRIFTS
- AMENDS SPEED TO MAINTAIN DISTANCE TO VEHICLE IN FRONT
- GUIDES VEHICLE INTO A PARALLEL PARKING SPOT

Permissable?

