



Assisted and Automated Driving

DEFINITION AND ASSESSMENT: SUMMARY DOCUMENT





Introduction

Automated Driving is expected to bring huge societal benefits, including a reduction in road casualties, as well as cuts in emissions and congestion.

But there will also be risks as drivers will be faced with differing levels of technology with different functionality. This may lead to confusion, which in turn could lead to accidents.

There are big implications for motorists and insurers alike.

The Government's Automated and Electric Vehicles Bill prepares the scene for Automated Driving however it'll be international type approval regulations that will define whether vehicles are automated or not.

However, technological changes have already begun with the arrival of 'Assisted Driving' features in a growing number of vehicles. These rely on the driver retaining responsibility for safe driving, but do they know that? These Assisted Driving Vehicles will offer safety challenges to both consumers and insurers alike, as well as great benefits.

Aims

The guidance in this document will:

Clearly differentiate cars with Assisted Driving features from Automated ones so that drivers understand they are responsible for safe driving in an Assisted Vehicle. With Automated Vehicles, which will be available from the mid 2020s, the manufacturer is liable.

Highlight areas of confusion in motorists' minds and explain, with our 10 recommendations, how to keep everyone safe.

Show how the new types of car could be assessed and rated for insurers and consumers.

Explain what information must be recorded and transmitted by a car after an accident so that there's no doubt about who was driving.

Summary

‘Vehicles that can drive themselves’

To avoid uncertainty when talking about ‘vehicles that can drive themselves’, insurers classify the technology under two headings:

1) **Assisted Driving:**

refers to systems that help the driver, e.g. by providing speed and steering support. However, the driver must remain engaged and responsible for safe driving.

2) **Automated Driving:**

this means systems which enable the vehicle to take full control of speed and steering. The user can safely get on with something else, like checking emails or watching a film.

Regulation

Governments around the world are keen to encourage the adoption of this new technology. Insurers support it because it has the potential to result in fewer people being killed and seriously injured.

Governments have applied a light touch in the control and use of these systems so far to avoid stifling innovation. In the UK, rules on insurance and liability will have to be changed in light of the Automated and Electric Vehicles Bill.

Design rules to create consistency are being drawn up internationally in Geneva by a United Nations body. But regulations controlling Automated Vehicles will not appear for some years.

Assessment framework

Assisted and Automated Driving will now be assessed so that the capability and performance of a vehicle can be rated by insurers. We have devised a series of 10 recommendations for both to guide vehicle manufacturers to ensure their safe use and operation.

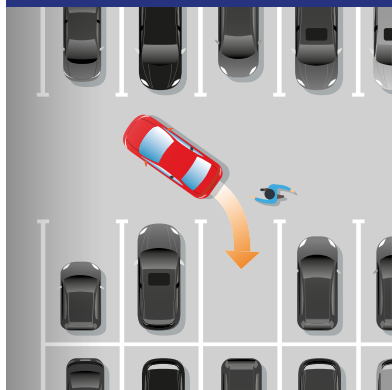
In the future insurers will test and rate vehicles against these criteria.

Four types of driving environment

Assisted and Automated Vehicles may operate in four types of driving environment known as operational areas or 'design domains'.

These are set out below and will be used to determine how a vehicle equipped with the new technology will operate, although other factors such as road conditions may limit what it can do.

Assisted and Automated Design Domain Definitions



The system shall support the driver to park the vehicle or, in a controlled area, can independently manoeuvre the vehicle, including into and out of parking zones/spaces without the driver present and avoiding collision with infrastructure, people and other vehicles and obstructions.



The system shall support the driver, or control the vehicle, over a speed range typical of city conditions <30mph and be able to manage typical city manoeuvres and conflicts at junctions, roundabouts, traffic lights and with pedestrians, cyclists, powered two wheelers (PTW) and complex unusual traffic conditions.







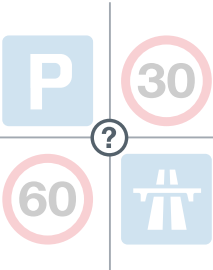
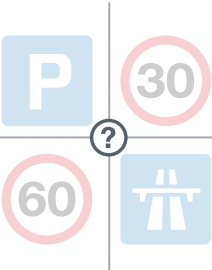
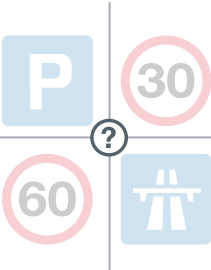

The system shall support the driver, or control the vehicle, over a speed range typical of inter-urban conditions <60mph and be able to manage typical inter-urban manoeuvres and conflicts at junctions, roundabouts, traffic lights and with pedestrians, cyclists, PTW and between unusual rural and urban conditions.



The system shall support the driver, or shall control the vehicle, over a full speed range likely to be used on a highway up to 70mph and will recognise variable speed limits. The system may be capable of automatic lane changing and overtaking.

Speeds shown relate to the UK.

A six-step scale, ranging from 0 and no automation to 5 and full automation, is used by the Society of Automotive Engineers (SAE) to define different levels of assistance and automation. These 'SAE levels' cover broad categories from partial to full automation. But the international insurance industry believes drivers will need a simpler interpretation as to what Assisted and Automated really mean.

The dividing line between Assisted and Automated Driving				
Automation for Insurers	ASSISTED		AUTOMATED	
Responsibility	Partial Automation 	Conditional Automation 	High Automation 	Full Automation 
SAE Level A vehicle will only be categorised as Automated if it meets the rules for Automation	2	3	4	5
Design Domains Assisted and Automated Vehicles may operate in one or more of four design domains				



Assisted driving
(driver remains responsible)



Automated driving
car takes control
(with steering wheel and pedals)



Autonomous
no driver present
(with no steering wheel or pedals)

Assisted Driving

The challenges for insurers

The biggest challenges posed by Assisted Driving for motor insurers are that:

- New types of collision could occur when a car is providing a high level of assistance and the driver may not be sufficiently engaged to respond to a hazard.
- Assisted Driving features may work differently in different vehicles, creating driver confusion which could lead to a collision.

The insurers' response

To respond to these challenges, motor insurers need absolute clarity on how to define Assisted Vehicles and how to differentiate them from Automated Vehicles. They also need a clear understanding of the different environments in which these vehicles are designed to work – the so-called design domains.

Definition of Assisted Driving

The following definition is intended to help manufacturers, regulators, insurers and drivers to distinguish a vehicle capable of Assisted Driving from an Automated Vehicle – and to understand not only how it works but what the driver's responsibilities will be.

Assisted Driving Vehicles provide drivers with continuous driving assistance for sustained periods of time in specified design domains. The driver is required to remain engaged with the driving task and driver monitoring systems will be in place to ensure this happens.

Recommendations for Assisted Driving

The insurance industry has drawn up 10 recommendations for Assisted Driving. These recommendations represent best practice to promote safety on the roads.

The full details can be found in our Assisted and Automated Driving Technical Assessment. They are summarised opposite.

What defines Assisted Driving?

Features and performance criteria

ACCIDENT DATA

Should record and report what systems were in use at the time of an accident

BACK-UP SYSTEMS

Safeguards in place should any systems fail

CRASH INTERVENTION

Vehicle should avoid or prevent an accident by responding to an emergency

SAFE STOP

Vehicle should execute an appropriate 'safe stop' if driver fails to respond to warnings

DRIVER MONITORING

Driver should remain engaged and able to take full control of the vehicle immediately

NAMING

Should clearly describe assistance capability

LAW ABIDING

Should comply with UK traffic laws and the Highway Code

DESIGN DOMAIN

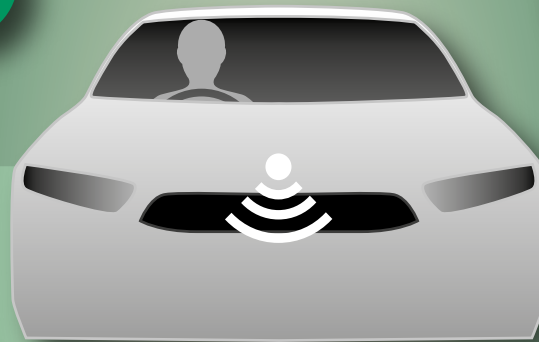
Systems should only provide driving assistance in areas where there are appropriate conditions to support it

STATUS

The system should clearly indicate when assistance is operating and when there is a change in the level or an end to the assistance provided

CAPABILITIES

Vehicle should provide assistance in all typical driving situations



#9

#10

#1

#2

#8

#3

#7

#4

#6

#5

Automated Driving

Challenges for insurers

The main challenges posed by Automated Vehicles to motor insurers are that:

- Insurers will become liable for accidents caused when a vehicle is in automated mode.
- Because the driver is effectively a passenger in this situation, they will be entitled to compensation if they're injured when their own vehicle is at fault.

Definition of Automated Vehicles

The following definition is intended to help regulators and insurers to classify these vehicles:

An Automated Vehicle is a vehicle capable of operating in clearly defined automated mode(s) which can safely drive the vehicle in specified design domains without the need to be controlled or monitored by an individual.

The vehicle must:

- Abide by traffic laws and the Highway Code or similar codes in countries other than the UK when it's in automated mode.
- Be able to interact with traffic and other road users, eg by adjusting speed.
- Offer the automated mode to the driver and be accepted before automated control begins.
- Only offer automated mode when the system confirms the operating conditions are suitable.
- Judge when these conditions no longer apply and hand back control to the driver.
- Select a safe place to stop if the driver doesn't take control.
- Record whether the automated mode is on or off and be able to identify who was in control if there's an incident.

Icons, colours and markings that tell a driver what technology is available and when it's working will need to be standardised across all Automated Vehicles to avoid confusion.

The insurers' response

Motor insurers need absolute clarity on how vehicles are defined and be able to differentiate them from Assisted Vehicles. They need a clear understanding of the different environments (design domains) in which these vehicles are designed to work. They must also have an up-to-date record of vehicles capable of automation.

Both insurers and manufacturers will need immediate access to data after any accident so that they can see whether the system or the driver was in control.

Requirements for Automated Driving

The insurance industry has drawn up a set of 10 requirements for Automated Vehicles, featured opposite. The full details can be found in our Technical Assessment document.

Identifying Automated Vehicles

The Automated and Electric Vehicles Bill requires that vehicles which can be automated in the UK will be placed on a list maintained by the Secretary of State for Transport. Vehicles from the list will need to be recorded on a Vehicle Identify Number (VIN) database that will specify any changes in a vehicle's automation capability. It will also be essential to record when a vehicle updates its systems.

Accident data

Insurers must have access to enough information to establish whether a vehicle's system or driver was in control before a crash. The data will include the time and place, whether the automated system was on or off, whether it was in parking or driving mode, the time at which control was handed over, a record of the driver's actions, the time since the last interaction with the driver, whether the driver was in their seat and whether their seat belt was on. A proposal has been put forward to centrally store this data.

What defines an Automated Vehicle?

Features and performance criteria

ACCIDENT DATA

Must record and report what systems were in use at the time of an accident

BACK-UP SYSTEMS

Safeguards must be in place should any systems fail

CRASH INTERVENTION

Vehicle must avoid or prevent an accident by responding to an emergency

SAFE HARBOUR

Vehicle must execute an appropriate 'safe stop' if unable to continue or if the driver fails to take back control

EMERGENCY HAZARD

Adequate and appropriate notice must be given if the vehicle needs to unexpectedly hand back driving control

NAMING

Must clearly describe Automated capability

LAW ABIDING

Must comply with UK traffic laws and the Highway Code

DESIGN DOMAIN

Systems must only provide driving automation in areas where there are appropriate conditions to support it

STATUS

Transfer of driving control must follow a clear 'offer and confirm' process

CAPABILITIES

Vehicle must manage all reasonably expected situations by itself



