Defining Safe Automation

A framework for regulating automated driving

Self-Driving

ABI

Thatcham Research
Safer cars fewer crashes

By 2021 it is anticipated that everyday cars will be available with an automated driving system (ADS), that enables drivers to do other things whilst the car drives itself on the motorway. With 93% of accidents attributed to human error, the insurance industry strongly supports the introduction of safe automated driving technology to reduce the number of deaths and injuries on UK roads. However, to achieve this, the car must be capable of safely driving itself in all situations without relying on the driver.

Currently, there is a lack of clarity around what defines automated driving and the role of the driver when the car is in automated mode. To facilitate the rollout of safe automation, it is essential that regulations and detailed guidelines are in place.

Driving systems that rely on the driver to maintain safety are not recognised by the insurance industry as being automated.

International regulators are currently formulating technical requirements for ADS. These rules are likely to determine which vehicles are classed as being capable of automation in the UK. Vehicle manufacturers must make data available to identify which individual vehicles have automated driving capability, and whether the vehicle was in automated driving mode should a collision occur.
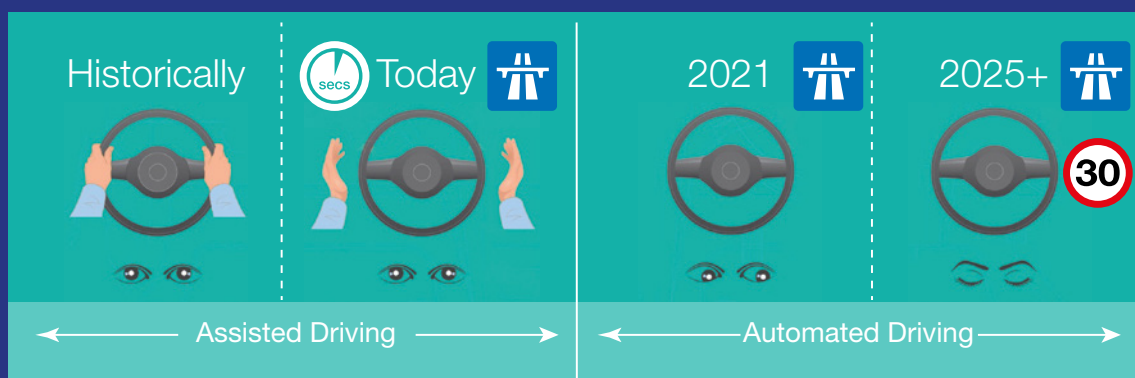
By 2021 the driver wil become a passenger

Assisted driving systems which help with speed and steering control are increasingly available on cars today. They have the capability to support the driver - but not to replace them.

By 2021 however, it is anticipated that vehicles capable of automated driving in certain circumstances will be on the market. These systems will allow the driver to safely do other things such as watching films or writing emails whilst the vehicle drives.

These first automated driving systems will be restricted to specific Operational Design Domains (ODD), for example Motorways. Initially they may only be capable of operating at lower speeds or in queueing traffic.

In order to be recognised as providing safe automation, the insurance industry has defined a framework that sets out key criteria that the ADS must meet to be classed as automated.
The criteria for Motorway automation are set out overleaf.

What defines an au

Criteria for Motor

ACCIDENT DATA
#10

Data must be made available to insurers and manufacturers through a neutral server should a collision occur to establish whether the vehicle was in automated driving mode

CYBER SECURITY
#9

ADS must be able to detect and minimise the consequences of cyber intrusions and data security breaches

EMERGENCY INTERVENTION
#8

Collision avoidance technology must be installed and activated for protection in critical situations. AEB will default on.

ENDING AUTOMATION
#7

Separate requirements for planned, transient, system failure and driver-initiated handovers are being developed. If the human operator fails to retake control the vehicle must find 'safe harbour'

SECONDARY TASKS
#6

Users must not be able to undertake secondary tasks where a transient handover is foreseeable

utomated vehicle?

rway Automation

#1

USER SUPPORT

Information, naming and training must ensure drivers understand their vehicle's capability

#2

LOCATION SPECIFIC

The system must be limited to specific manufacturer defined Operation Design Domains (ODD)

#3

SAFE DRIVING

Automated Driving Systems (ADS) must be law abiding and capable of safely driving in all reasonably expected situations within their ODD

#4

DRIVER MONITORING

Driver status monitoring is essential where there is a potential for a transient handover. 'Hands-on-wheel' will not be sufficient

#5

STARTING AUTOMATION

A clear 'offer and confirm' process is required to engage ADS only within the ODD

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"Ending Automation" – Handing back safely to the driver

The transition of control from the ADS to the driver is a critical aspect of safe automated driving. The system will hand back control in three different ways:

A **planned** manner: where the system gives extended notice to the driver that automated driving is ending and that they will need to take control of the driving function

Transient hand backs: where the conditions for automation are no longer met due to traffic, weather or other factors. In these circumstances a faster hand back will be necessary, and the driver must be ready to retake control. The ability for the system to monitor the driver is critical to ensure the driver is ready to take back control safely.

In the event of a **system failure**, the vehicle must carry out a managed hand back to the driver or reach 'safe harbour' on its own. This will require a sufficient level of system redundancy. AEB will default on as a last resort in extreme situations.

Testing Automated Driving Systems

Automated Driving Systems will require substantial pre-launch testing to confirm safe operation - the majority of which will be performed in a virtual environment. This must be complemented with on-road testing to ensure that the vehicle behaves in the same way in the real world. In addition, track testing will be required to assess critical situations that are neither safe to evaluate nor frequently encountered on the public road.
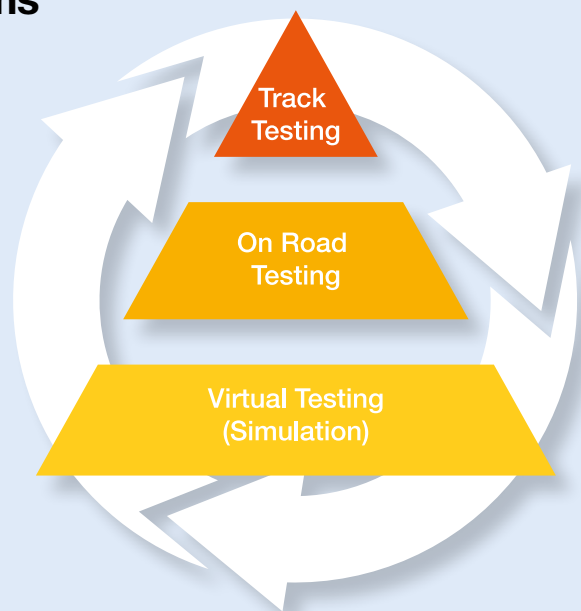
The testing process will be iterative, and a robust feedback process will be required to ensure all areas of testing meet safety requirements. The capability to change system performance through Over-The-Air (OTA) updates will require a further level of ongoing testing to ensure continued safe automation.
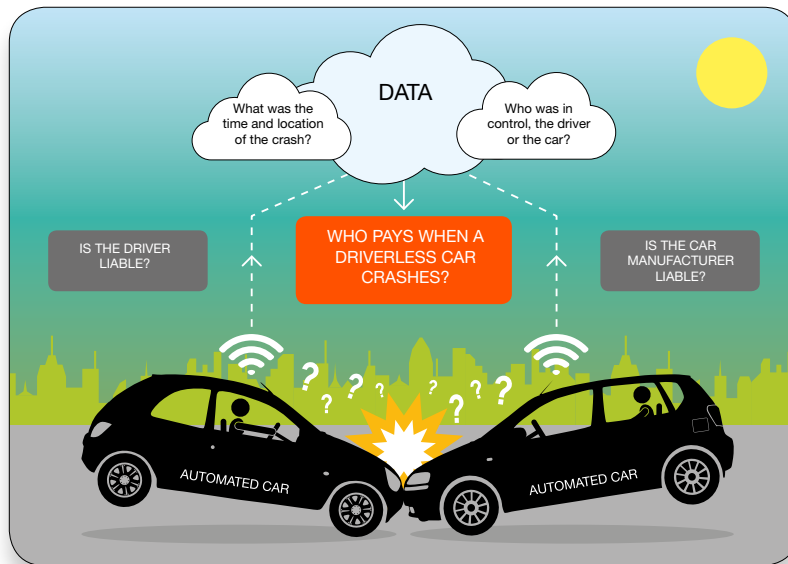
Immediate access to data

The Automated and Electric Vehicles Act 2018 introduces additional compulsory insurance cover for accidents that are 'caused by' a vehicle with an ADS engaged. Additionally, where there is a fault or failure in the ADS, the legislation allows insurers to recover these costs from the vehicle manufacturer.

To settle such claims efficiently for consumers, both the insurer and the vehicle manufacturer will need to have immediate access to sufficient data from the vehicle to determine whether the ADS or driver was in control when the accident occurred.

The minimum data requirement is:
- Event time stamp
- Automated mode
- Driver acceptance between automated/manual mode time stamp
- Record of driver intervention of steering, braking, acceleration or gear shift
- Driver seat occupancy
- Has Minimum Risk Manoeuvre (MRM) been triggered
- System status (linked to fault code)

Next steps

The ABI and Thatcham Research will be issuing a detailed definition document for Regulators in June 2019. This will contain the framework for defining safe automation and detailed requirements for motorway automation.

This document will be updated with iterations to include detailed requirements for other driving domains: Parking, City and A-Roads.