Regulation of Autonomous Vehicles

Dr Jo-Ann Pattinson, Research Fellow
Email: J.M.Pattinson@leeds.ac.uk

This presentation was given by Dr. Jo-Ann Pattinson during the Public Webinar of 4 July 2019, on Legal perspectives of using IoT for AD, this in the context of AUTOPILOT H2020 project. For any request please contact j.allard@mail.ertico.com or the speaker.
SAE Automation Levels

0
No Automation
Zero autonomy; the driver performs all driving tasks.

1
Driver Assistance
Vehicle is controlled by the driver, but some driving assist features may be included in the vehicle design.

2
Partial Automation
Vehicle has combined automated functions, like acceleration and steering, but the driver must remain engaged with the driving task and monitor the environment at all times.

3
Conditional Automation
Driver is a necessity, but is not required to monitor the environment. The driver must be ready to take control of the vehicle at all times with notice.

4
High Automation
The vehicle is capable of performing all driving functions under certain conditions. The driver may have the option to control the vehicle.

5
Full Automation
The vehicle is capable of performing all driving functions under all conditions. The driver may have the option to control the vehicle.

AUTOPILOT Testing
HAV are proposed as a solution for reducing collisions and reducing the number of causalities on the roads, however before this occurs not only must the technology be state-of-the-art, we need to address:

- Standards
- How to test those standards
Regulation facilitating innovation

UNECE WP.29

Adaptive Regulation

- Technological Advancement
- Innovation
- Lessons Learned

Consumer Protection

Limitations
UNECE REGULATION impact upon safety

Source: Australian Government Department of Infrastructure and Transport, Regulation Impact Statement for the Harmonisation of the Australian Design Rules
can help inform the formulation of policy by:

Assess current state of the technology

Identify areas of safety relevant to the certification process
Classical Vehicle Standards

- Rollover tests
- Seatbelts
- Light signaling
- Adhesion on wet surfaces
- Emergency Stop
- Parking laden vehicle 20% gradient
Three Pillar Approach

This approach incorporates anticipating and responding to the behaviour of other road users.
AUTOPilot SITE testing

• Testing at pilot sites relevant to matters of the future certification of HAV

• In particular testing involved accumulating data regarding the detection of vulnerable road users (VRU)

• Tests were conducted to ascertain if HAV adapted driving behaviour to avoid VRU by way of in-vehicle sensors and via smart phone detection
At Brainport (NL) The vehicle detected VRU using ITS G-5 and 4-G on VRU smartphones, and adapted driving by braking earlier.

The vehicle detected and avoided a crowd on the planned route by use of wireless sniffer receiving wifi probes.

Figure 22 – Wireless sniffer receiving wireless signals from VRU.
Likewise, in the Urban Driving Test Case, a pedestrian and cyclist crossed in front of vehicle. Tests involved comparing the responses between:

1. With VRU connected via IoT and 2. Tests relying upon in-vehicle sensors only.
VERSAILLES RESULTS

• When relying only upon the in-vehicle sensors only, the vehicle braked abruptly, particularly when the cyclist crossed.

• When the cyclist was connected via IoT, the vehicle adapted speed well in advance - braking was very smooth.

• Confirms the requirement for critical and edge case scenarios (obstructed VRU) within the certification process and that HAV will require access to multiple data sets to properly anticipate VRU.

• Highlights the additional safety which would be afforded to VRU carrying IoT (Smartphone or Bluetooth Low Energy Beacons).
The certification of HAV by reference to rigorous safety standards and testing is an essential component to its successful deployment.

Work carried out within AUTOPilot compliments the adaptive model of regulation favoured by the UNECE.

Provides data useful in the improvement of policy in response to state of the art developments in technology.
Thank you