

**Response to Law Commissions' third consultation on Automated Vehicles  
(Law Commission Consultation Paper 252; Scottish Law Commission Discussion  
Paper 171)**

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What is your name?

Robert Houghton

What is the name of your organisation?

Imperial College London

Are you responding to this consultation in a personal capacity or on behalf of your organisation?

Personal response

**CHAPTER 4: SELF-DRIVING AND HUMAN INTERVENTION**

**Consultation Question 1 (Paragraph 4.114)**

We provisionally propose that:

(1) a vehicle should not be classified as self-driving if, with the ADS engaged, the user-in-charge needs to monitor the driving environment, the vehicle or the way it drives;

(2) it is nevertheless compatible with self-driving to require the user-in-charge to respond to a clear and timely transition demand which:

- (a) cuts out any non-driving related screen use;
- (b) provides clear visual, audio and haptic signals; and
- (c) gives sufficient time to gain situational awareness;

(3) to be classified as self-driving, the vehicle must be safe enough even if the human user does not intervene in response to any event except a clear and timely transition demand.

Do you agree?

[Respondents chose from the following options: yes; no; other.]

Yes

I agree.

- 1) The individual is still driving, but it's just an evolution from what current drivers do now.
- 2) The car is not fully driving, and effectively the human still needs to intervene, which is probably one of the worst states a human could be put in.

cuts out any non-driving related screen use;  
provides clear visual, audio and haptic signals; and  
gives sufficient time to gain situational awareness;

All fantastic suggestions however will these be optimized for possible fatigue/attentional tunneling/individual differences as well as possible skill/cognitive degradation due to prolonged absence of driving skill?

3) to be classified as self-driving, the vehicle must be safe enough even if the human user does not intervene in response to any event except a clear and timely transition demand. I think this is the only definition that could be legally called self driving, one in which the human does not intervene in the driving state.

### **Consultation Question 2** (Paragraph 4.115)

We welcome views on whether self-driving features should be designed to ensure that they can be used by people with hearing loss.

Haptic and visual feedback, however Haptic feedback is probably the better, as individuals can miss visual cues when attention is narrowed or focused. Visual feedback may also become an overt distraction.

## **CHAPTER 5: HOW SAFE IS SAFE ENOUGH?**

### **Consultation Question 3** (Paragraph 5.118)

We provisionally propose that the decision whether a vehicle is sufficiently safe to “safely drive itself” should be made by the Secretary of State, as informed by advice from a specialist regulator.

Do you agree?

[Respondents chose from the following options: yes; no; other.]

Other

This decision should only be given from a specialist regulator and a team of scientists who have fully evaluated every aspect of the self driving system, both the vehicle, environment and user. A politician should not really be involved in this process, as they are not specialists in AV and their safety issues.

### **Consultation Question 4** (Paragraph 5.119)

We welcome observations on which of the following standards is most appropriate when assessing the safety of automated vehicles:

- (a) as safe as a competent and careful human driver;
- (b) as safe as a human driver who does not cause a fault accident;
- (c) overall, safer than the average human driver.

[Respondents chose from the following options: as safe as a competent and careful human driver; as safe as a human driver who does not cause a fault accident; overall, safer than the average human driver; none of the above.]

As safe as a competent and careful human driver

It must be upheld to the highest safety standards, because it is not a human, the errors the vehicle may possess are binary in nature, thus there can be no assessment or flexibility one may afford a human driver. For example a human driver passing out for whatever reason and crashing their vehicle.

### **Consultation Question 5 (Paragraph 5.120)**

We welcome observations on how automated vehicles can be made as safe as reasonably practicable.

Designed and introduced with care. Full assessments of how the vehicle, environment and human operators work in tandem. A simple suggestion would be, if the AV uses computer vision in order to stop, ensure this is not compromised in differing light levels, for example excessive brightness or darkness, furthermore conditions such as rain, wind, snow or ice do not impact the system. The second thing would be excessive user testing, and really ensuring they are realistic in terms of traffic and lengths of time. Maybe studies use simulators and for short lengths of time. If an operator is responsible for a vehicle for 4 hours ever day for 5 days, this needs to be examined in a realistic manner, and replicated in order to fully assess the extent individual differences in operators impact safety.

The final comment really relates to the design of operator tasks in relation to cognition. Monitoring in itself is very difficult and from the report it would seem operators are being put in an environment that either is quite cognitively exhausting or at times, not particularly cognitively stimulating which may be even worse due to cognitive underload states resulting in a lack of attention and reaction to stimuli or events, thus operators after a period of monotony may not be able to suitably react quick enough to events.

This also applies to if operators are required to take some sort of control of the vehicle, is how they perceive the environment from the vehicles perspective to properly control it safely is realistic. For example one possible solution to depth perception is operators have virtual reality model of the vehicles operating environment. More than ever, the operators environment and tasks need to be designed to be cognitively well balanced and try and induce negative cognitive states to a lesser degree. Operators should be checked in with other a longitudinal length of time to ensure their performance is not compromised due to things like fatigue and excessive suboptimal workload states like Over/Underload

## **CHAPTER 11: INVESTIGATING TRAFFIC INFRACTIONS AND COLLISIONS**

### **Consultation Question 25 (Paragraph 11.69)**

We provisionally propose that a specialist incident investigation unit should be established:

- (1) to analyse data on collisions involving automated vehicles;
- (2) to investigate the most serious, complex or high-profile collisions; and
- (3) to make recommendations to improve safety without allocating blame.

Do you agree?

[Respondents chose from the following options: yes; no; other.]

Yes

Definitely, Rail/Maritime/Aviation has similar Units and this is definitely needed. It would be useful to have a variety of experts/specialists in the Unit, Computer Scientists,

Psychologists/Ergonomists, Engineers etc as accidents will probably be a combination of technical and human errors. As more AVs become more and more common, there will be unexpected behaviour/user changes in the roads both of traditional road users and AV users that will need insight and assessment into the future.

### **Consultation Question 26** (Paragraph 11.82)

We provisionally propose that the UK Government should establish a forum for collaboration on the application of road rules to self-driving vehicles.

Do you agree?

[Respondents chose from the following options: yes; no; other.]

Yes

Definitely. Rules need to be developed from both users and non-users to get the greatest application in terms of safety and satisfaction.

### **Consultation Question 27** (Paragraph 11.83)

We welcome views on:

- (1) the issues the forum should consider;
- (2) the composition of the forum; and
- (3) its processes for public engagement.

1) The main issues are probably safety, who is responsible and what is a good legal definition in the British landscape, and this should be understood by the vast majority of individuals, not just users.

2) Composition could take many forms, but ideally a combination of surveys and focus groups.

3) Newsletters, meetings etc would be useful

## **CHAPTER 13: REMOTE OPERATION: NO USER-IN-CHARGE VEHICLES**

### **Consultation Question 37** (Paragraph 13.67)

We provisionally propose that:

(1) where an individual is exercising latitudinal and longitudinal control (steering and braking) over a vehicle remotely, that should not be regarded as a form of “self-driving”; and

(2) where lateral and longitudinal control are exercised by an ADS, all other forms of remote operation should be regulated as “self-driving”.

Do you agree?

[Respondents chose from the following options: yes; no; other.]

Other

In relation to question one. The individual is still responsible for certain control aspects of driving, steering and breaking, thus this is akin to other human-robot partnerships where the robot takes over some of the responsibility but is still working with an active human participant.

2) If the human being is not responsible for any control over the vehicle, then it would not be unreasonable to call it self driving. However if the human is still required to monitor the vehicle, is the car truly driving itself, or is the act of actually driving just taken away from the human being.

We welcome views on whether the current definition of when a vehicle “drives itself” under the Automated and Electric Vehicles Act 2018 should be amended to deal with some forms of remote operation which may involve a degree of “monitoring”.

Monitoring behaviours should not be classed in the same category of vehicles that drive itself, as monitoring behaviour is an extremely difficult task for a human being. If it was a human being purely monitoring but with no credence to take over driving or interrupt the system, then it could be included, however if monitoring means the human operator can or would be expected to take over or have input into the vehicles behaviour, then the car is no longer truly self driving. What is occurring here is the role of the driver has shifted from manually controlling the car, to monitoring the vehicles behaviour, but this is still driving in a sense, as the individual is involved in the act.

### Consultation Question 38 (Paragraph 13.86)

We provisionally propose that:

(4) the regulation of self-driving vehicles should distinguish between an Automated Driving System Entity (which vouches for the design of the system) and an operator (responsible for the operation of individual vehicles);

(5) all vehicles authorised for use on roads or other public places with no user-in charge should either:

(a) be operated by a licensed operator; or

(b) be covered by a contract with a licensed operator for supervision and maintenance services;

(6) it should be a criminal offence to use a NUIC vehicle on a road or other public place unless it is operated by a licensed operator or is covered by a contract with a licensed operator for supervision and maintenance services.

Do you agree?

[Respondents chose from the following options: yes; no; other.]

Yes

1) A distinction could be made, however it may be more beneficial in combining both so that the design process is optimized for those who will license the operation.

2) Definitely, whilst I am no legal expert, I can see this being beneficial in case of accidents etc.

3) Again definitely, if different or home built/prototype NUIC vehicles are allowed on the road without a true and solid evidence based understanding the risks of the operators, then accidents and incidents could occur

### **Consultation Question 39** (Paragraph 13.92)

We welcome views on whether NUIC operators should be required to demonstrate professional competence through a safety management system, as set out in a safety case.

Absolutely. Remote operation of a vehicle is not a far cry from controllers in rail and aviation. All these individuals demonstrate professional competencies regularly and for NUIC it should be no different. In pages 217-218 of the report it outlines how operators are at risk of fatigue, but also at risk of experiencing cognitively disengaged states, likely a combination of monitoring and monotonous behaviours. In the safety management system, relative consideration should be given in order to reduce monitoring behaviours as much as possible and promoting cognitive engagement in meaningful work.

### **Consultation Question 40** (Paragraph 13.108)

We provisionally propose that, irrespective of the nature of the vehicle, a licensed operator should be under a duty to:

- (1) supervise the vehicle;
- (2) maintain the vehicle;
- (3) insure the vehicle;
- (4) install safety-critical updates and maintain cybersecurity; and
- (5) report accidents and untoward events (as defined by the regulator).

Do you agree?

[Respondents chose from the following options: yes, a licensed operator should be subject to all the listed duties; a licensed operator should be subject to some but not all of the listed duties; no, a licensed operator should not be subject to any of the listed duties; other.]

Yes, a licensed operator should be subject to all the listed duties

I agree with the above, possibly even spread across multiple organisations to ensure maximum safety.

### **Consultation Question 41** (Paragraph 13.109)

We provisionally propose that legislation should include a regulation-making power by which some or all of these duties could be transferred to the registered keeper or owner, if it was shown that it was appropriate to do so.

Do you agree?

[Respondents chose from the following options: yes; no; other.]

Yes

This is fair, as NUIC vehicles could definitely empower people, however again, they must demonstrate they have the ability to match licensed operators in regards to safety in terms of maintaining and operating a NUIC vehicle.

#### **Consultation Question 42** (Paragraph 13.116)

We welcome views on how accessibility standards for Highly Automated Road Passenger Services (HARPS) might be developed.

It would be prudent to consider all possible users from very elderly to anyone suffering both cognitive and physical disabilities and ensuring the HARPS is inclusive. Maybe design for both the common person as well as the extremes in the population, this would ensure no users are discriminated or disadvantaged.

We provisionally propose that:

(1) an accessibility advisory panel should be formed to include:

(a) the Equalities and Human Rights Commission; and

(b) representative groups for disabled and older persons;

(2) the Secretary of State should be obliged to consult with the accessibility advisory panel prior to setting any national minimum standards on HARPS;

(3) there should be a duty to periodically re-consult the accessibility advisory panel at set intervals to ensure requirements keep pace with developing evidence of technical feasibility and changing needs.

Do you agree?

[Respondents chose from the following options: yes; no; other.]

Yes

All of it sound very good!

We welcome views on what the set interval for periodically re-consulting the accessibility advisory panel should be.

A good period would likely be around every 10-12 months. I would also ensure differing individuals of socioeconomic income are included, as someone from a very impoverished background will have a very different experience to someone who is affluent.

#### **Consultation Question 43** (Paragraph 13.133)

We welcome views on who should administer the operator licensing scheme.

I think this will probably be a multistakeholder process, Some sort of combination between legal entities, vehicle entities and human performance entities such as Psychologists/Ergonomists.