



Preparing for HARPS

**KPMG's response to the Law Commission
of England and Wales and the Scottish
Law Commission's Consultation Paper 2**

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Dear Members of the Law Commissions,

First and foremost, we are delighted to see the continued work that you are doing in this space. The creation of appropriate laws that will support the growth and adoption of autonomous vehicles is a key step in realising the potential benefits of self-driving cars and minimising the most significant risks.

We welcome the opportunity to respond to your second consultation paper on the topic.

In the following pages, we have outlined considerations in response to your consultation questions where we felt we could provide meaningful insights. This includes considerations in respect of:

Chapter 3	<ul style="list-style-type: none">— Distribution of responsibilities and obligations amongst involved parties— A single national operating license system
Chapter 4	<ul style="list-style-type: none">— Those who would require a HARPS operator license— Community and other exemptions to licensure— Ability of the Secretary of State to grant licensure exemptions— HARPS operator requirements— Demonstrating professional competence as a transport manager— Requirements for providing adequate maintenance arrangements— Classifying operators as users— Duties of the HARPS operator— Regulating HARPS passenger prices— Provision of price information

Chapter 5	<ul style="list-style-type: none"> — Ability to own a private autonomous vehicle — Operating licenses for private vehicles — Responsibilities of a private owner — Maintaining a privately-owned vehicle — Implications of peer-to-peer lending
Chapter 6	<ul style="list-style-type: none"> — Accessibility objectives and potential benefits — Accessibility responsibilities for HARPS operators — Meeting accessibility as a condition of licensure
Chapter 7	<ul style="list-style-type: none"> — HARPS' potential to increase vehicles on the road — Minimising zero-passenger trips — Amendments to traffic regulation orders (TROs) — Regulating the use of kerbside — Balancing road pricing and parking charges — Potential future of road pricing — Restricting the quantity of HARPS vehicles
Chapter 8	<ul style="list-style-type: none"> — Incentivising multi-modal travel — HARPS' subjection to bus regulation — Ability to require joint provision of service by operators

For some topics, we have set out additional considerations which do not directly relate to the consultation questions, but could, we feel, be of relevance in helping to develop legislation. These are summarised at the end of our submission.

We have supported our considerations, where possible, with examples from other countries who are also undertaking steps to create autonomous vehicle legislation, including Singapore, Australia, France, the Netherlands, and the United States.

We would also like to express our appreciation for your approach to Chapter 2, where you ask, "What should a regulatory system for HARPS be designed to achieve?" We wholeheartedly agree that the policy for HARPS (or Highly Automated Road Passenger Services) should be principle-based, focused on unlocking the potential benefits of HARPS and minimising the potential risks. We also agree with the benefits and risks that you have outlined. On the benefits side: reduced dependency on car ownership and, therefore, reduced congestion; reduced car parking; affordable and flexible bus services; greater accessibility; improved safety; and increased productivity through reclaimed times. On the risks side: concerns around safety, potential congestion, reduced accessibility, rural access, and unemployment.

In our response to your first consultation, we had recommended the adoption of an outcome-based approach to regulation, and believe that your approach to Chapter 2 and the second consultation reflects this recommendation; however, in order to be even more explicit about how each recommended regulation links to specific objectives, you might consider an

objective-mapping exercise for each chapter that is explicit about the trade-offs and considerations involved.

Another key recommendation of our previous response was to ensure that the regulations were flexible and outcome-based since there are so many “known-unknowns” and “unknown-unknowns” that the law will eventually have to accommodate. We believe that the second paper would benefit from a more explicit emphasis on how the recommended laws and regulations will be updated to keep pace with changes in the technology and operating environment. For instance, for the “known-unknowns”, the Commissions could draw a roadmap for policy development against scenarios for HARPS adoption, which take into account how various inputs like testing and deployment data, regulatory sandboxes, or the evolving experiences of other jurisdictions will feed into the process. For the “unknown-unknowns”, the Commissions could explicitly build regulatory reviews and sunset clauses into the policy development process.

We hope our insights, along with the many others who will respond, can help contribute in a meaningful way to your work and we look forward to seeing your final recommendations. Should you have any questions or require any further information regarding our submission please don't hesitate to contact me.

Yours sincerely,



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Chapter 3: Operator Licensing – A Single National System

Responsibilities

You state that “the law must...identify the person or organisation responsible for updating, insuring, and maintaining the vehicles and for guarding against cyber-attacks.”

To understand where these responsibilities might lie in the future, we must first examine where they currently lie. To do this, we consider three common scenarios:

1. “Personal-Owned Vehicle”, wherein an individual owns a vehicle
2. “Leased Vehicle”, wherein an individual or company leases a vehicle
3. “Company-Owned Vehicle”, wherein a company owns the vehicle, likely as a part of a fleet, and allows employees or other individuals to utilise the vehicle. Typical examples of this would be trucks, taxis, and rental vehicles

Within each of these three scenarios, we examine how responsibility is distributed amongst the following parties:

- Vehicle Owner: the registered owner of the vehicle
- Vehicle Driver: the driver of vehicle
- Vehicle Lessee: in a leasing situation, the party leasing the vehicle from the registered owner, or “lessor”

The distribution of who could be considered to be the primary responsible party for each of the responsibility areas you have identified is set out below:

Responsibility Area	Scenario 1: Personal-Owned Vehicle	Scenario 2: Leased Vehicle	Scenario 3: Company-Owned Vehicle
Updatingⁱ	Vehicle Owner	Vehicle Lessee	Vehicle Owner
Insuringⁱⁱ	Vehicle Owner ¹	Vehicle Owner ¹	Vehicle Owner ¹
Maintainingⁱⁱⁱ	Vehicle Owner	Vehicle Lessee	Vehicle Owner
Cyber-Security^{iv}	Vehicle Owner	Vehicle Lessee	Vehicle Owner

¹Vehicle drivers are also required to hold insurance

In addition to the above responsibility areas, the following responsibility areas should also be considered in their current state:

Responsibility Area	Scenario 1: Personal Owned Vehicle	Scenario 2: Leased Vehicle	Scenario 3: Company-Owned Vehicle
Registration^v	Vehicle Owner	Vehicle Owner	Vehicle Owner
Roadworthiness^{vi}	Vehicle Driver	Vehicle Driver	Vehicle Driver ¹
Vehicle Tax^{vii}	Vehicle Owner	Vehicle Owner	Vehicle Owner
MOT Certification^{viii}	Vehicle Owner	Vehicle Owner	Vehicle Owner

¹Vehicle owners hold some responsibility for roadworthiness, such as making sure there are regular safety inspections and having a system to ensure that non-roadworthy vehicles are taken out of service^{ix}

As shown above, responsibility typically falls primarily on the vehicle owner or driver except in certain situations, such as in the event of a defect or misrepresentation where manufacturers and lessors may be liable for vehicles.

It is likely that many of these responsibilities will not shift significantly as vehicles become driverless; however, "updating", "insuring", "cyber-security", and "roadworthiness" may see a shift in the responsible parties, whether wholly or partially, particularly as a new party, the "vehicle operator", replaces the "vehicle driver".

With the removal of the vehicle driver in autonomous vehicles, the "vehicle operator" will likely be responsible for the vehicle's movements in the absence of a vehicle driver. As such, it will primarily be the vehicle operator's responsibility to ensure that vehicle is roadworthy before operating it. While the vehicle owner will still have a responsibility to insure the vehicle, the operator will also likely have a duty to hold the proper insurance to operate the vehicles in the absence of the driver.

In the future, manufacturers are anticipated to increasingly make software updates available over the air, no longer requiring vehicle owners to physically bring their cars into dealerships for software updates.^x While the responsibility of installing these updates currently falls primarily on the vehicle owner, you should consider whether any responsibility should fall on the manufacturer to ensure that the software is installed given the expected reliance of vehicles on this software for safe travel. For example, software updates may need to be classified based on the level of urgency; then, for top levels of urgency, owners may need to be given a certain number of days to install the software before their vehicles are temporarily disabled by the manufacturer until the software is installed. This responsibility may need to be legally imposed.

Additionally, it should be considered if there should be some sort of central body that must approve software in order to help ensure vehicles are acceptable for use on the roads. In the United States, the Federal Aviation Authority (FAA) not only approves designs of aircraft^{xi}, but also approves potential software and electronic hardware, such as autopilots, flight controls, and engine controls.^{xii} The FAA certifies this software using set approval guidelines which includes not only procedures for inspection of the code, but also provides checks for proper uploads to aircraft.^{xiii} A similar body and related guidelines could be established in the UK for certifying the design and software for autonomous vehicles.

Additional considerations should be given to expectations around software updates. For example, consider that Apple's current iPhone software only supports phones released in the last five years^{xiv} while the average age of vehicles is 8 years old in the UK.^{xv} You should consider if there should be any requirements for the minimum number of years that a vehicle should be expected to be updated or if there should be any requirements to make it clear to the consumer how long the vehicle's life is expected to be.

Additionally, Apple and Samsung were both fined for intentionally using software updates to slow down old versions of their phones, helping support increased sales of newer models.^{xvi} You should, therefore, consider if there should be any laws proactively preventing vehicle manufacturers from following a similar course of action to improve vehicle sales. This may be particularly important as an intentional reduction in performance of software could create potential safety risks.

As you note, this reliance on software and increased connectivity will make cyber-security increasingly important. Recognizing this importance, Singapore has released a set of standards for cyber-security related to autonomous vehicles which includes standards for security measures and testing.^{xvii} This testing will likely be completed by the vehicle manufacturers. Additionally, in the U.S., the Federal Trade Commission has successfully settled with several companies accused of failing to take reasonable measures to secure the code of their products.^{xviii} These demonstrate a potential shift of some of the responsibilities of cyber-security from the vehicle owner onto vehicle manufacturers.

While some responsibility may shift to manufacturers, vehicle operators will still have a role to play in cyber-security as well. In the aviation industry, where cyber-security is also of significant importance due to an increased reliance on software and connectivity, certain operators in the UK, France, and Germany are under an obligation to implement appropriate cyber-security measures to minimise the impact of breaches with a view to ensuring continuity of services.^{xix} In the UK, the Civil Aviation Authority (CAA) and Department for Transport (DfT) are jointly responsible for ensuring operator compliance and the National Cyber Security Centre acts as the Computer Security Incident Response Team (CSIRT).^{xx} The CAA and DfT have the ability to impose a range of penalties on operators for non-compliance, including fines up to £17 million.^{xxi} Similar requirements and oversight bodies could be created for operators of self-driving vehicles.

The implications of vehicle owners who intentionally hack or alter software within their own vehicles for modifications should also be considered. For example, a Tesla owner who did not like the speed restrictions of requirements to keep hands on the wheel while in autopilot mode, hacked his own vehicle in order to remove the safety restrictions.^{xxii} In situations like this, responsibility may be hard to allocate given that although an individual may have intentionally hacked their own vehicle, the manufacturer may have also been negligent in taking reasonable measures to secure their vehicle software. Legislation may assist in defining where this responsibility lies.

Data regulation will likely be a key element to a successful and safe liability model. In a simple world, the data from the vehicle could be used to apportion blame and liability; however, governments around the world are still trying to figure out what the appropriate data regime is and whether companies can be mandated to share data from a "black box". You should, therefore, consider working closely with jurisdictions in the UK and internationally to develop a system in which data regulation feeds into cybersecurity and liability-distribution objectives. There are additional questions to be considered around who can use data from self-driving vehicles, for what purpose, and how can the data be protected and secured. The General Data Protection Regulation (GDPR) will apply to personal data – including data such as movement which enables personal identification - but regulation will also need to consider what data is commercially sensitive to OEMs, and whether there are minimum data provision requirements

from both a Vehicle to Vehicle (V2V) and Vehicle to Infrastructure (V2X) perspective to facilitate improvements in safety and network management.

Clearly defining any legal duties associated with these responsibilities may create a clearer environment for each of these parties to operate in and help enable the growth of autonomous vehicles in the United Kingdom. Australia is currently undergoing a similar exercise, working on defining the obligations for any relevant agencies on a national level.^{xxiii} Clearly defining these responsibilities and associated negligence and blame criteria through legislation may prove to be difficult, however, given the known-unknowns and unknown-unknowns of autonomous vehicles. As such, liability may, to some degree, remain a matter of case law which will develop gradually as cases are tried by higher courts.

Whilst this paper focuses on vehicles that do not require a driver, there will be a period of time where self-driving vehicles are operating on the roads at lower levels of autonomy, such as being remotely handled, prior to the adoption of fully autonomous vehicles,. These responsibilities will, therefore, likely need to be defined at each level of autonomy, not just at a fully-autonomous level.

A Single National System of Operator Licensing

Consultation Question 1 states, “Do you agree that [HARPS] should be subject to a single national system of operator licensing?”

The below table lists several considerations both for and against a single national system of operator licensing:

Considerations for Why HARPS <i>Should</i> be Subject to a Single National System of Operator Licensing	Considerations for Why HARPS <i>Should Not</i> be Subject to a Single National System of Operator Licensing
<ul style="list-style-type: none"> — As you stated, enforcing standards across local or regional borders may prove to be difficult, particularly if there are multiple divisions of vehicles with different oversight bodies for each within each jurisdiction — As you stated, the current divisions between vehicle types which are heavily based on the role of the driver will no longer be valid in the long-term as drivers are eliminated — As you stated, having different licenses may enable “regulatory shopping” 	<ul style="list-style-type: none"> — Localities or regions may want to have some level of influence on the standards or requirements for operator licensing — Different types of vehicles may require different skills to operate and, as such, it may be beneficial to create new types of vehicle divisions and related licenses for each

This question, in our view, has two axes for consideration: (1) national versus localised and (2) singular (i.e., one type of license) versus multiple (i.e., multiple types of licenses), leaving four possible options of licensing systems:

National vs. Localised	<i>Option 1</i> National // Multiple	<i>Option 2</i> National // Singular
	<i>Option 3</i> Localised // Multiple	<i>Option 4</i> Localised // Singular
	Singular vs. Multiple	

In consideration of the first axis, national versus localised, it may be possible to give localities or regions some level of power in setting licensing requirements. In the U.S., for example, individual states determine the minimum age for licensing and also create their own licensing tests; however, the licenses are still valid for operating vehicles in all states.^{xxiv} In the context of HARPS licensing, minimums could be set on a national level and localities or regions may impose certain additional requirements to obtain a license if they are based within their locality or region. This could, however, create issues where an entity is based in one locality or region but mainly operates in another region as way to avoid having to obtain a more restrictive license, similar to regulatory shopping. While a solution to this may be to require an operator to obtain a license in each jurisdiction where they operate, this could cause challenges as not only would enforcement be difficult, but if accurately enforced, then vehicles could be required to stop at jurisdiction borders in which they are not licensed to operate and passengers to then book another vehicle which has a license within the new jurisdiction. This could cause adoption of HARPS to be stagnated due to inefficiencies, inconveniences to customers, and the potential reduction in ability to scale operations.

Consideration should also be given as to whether licensing should be completed on a scale broader than national, such as with other countries within Europe through some type of agreements. This could allow for quicker adoption of HARPS. For example, an operator was granted a license by a partnering country wherein the license also allowed them to operate in the UK, the upfront costs and time the operator would typically take to obtain a licence in the UK would be eliminated. Additionally, by partnering with countries, such as France, vehicle could flow more freely from one country to another.

In consideration of the second axis, singular versus multiple, the current divisions between types of licenses may not be applicable in the future and may enable “regulatory shopping” if continued in the future. While having only one type of license with unified standards could, indeed, eliminate these potential issues, there may be a need to create a new type of division between vehicle types and related licenses for each. For example, the skills required to operate a large, 30-passenger vehicle may be significantly different from the skills required to operate a small, 5-passenger vehicle and could, therefore, warrant different requirements be achieved to be granted a license to operate each.

Additional consideration should also be given as to whether a different license should be required for those operating vehicles carrying goods rather than passengers or even those with a mix of goods and passengers. For example, the UK currently requires those operating a heavy goods vehicle (HGV) to have a different license from a standard driver's license.^{xxv}

In addition, consideration will also need to be given as to how this will work in a shared environment where modes like taxis and public service vehicles (PSVs) are still subjected to their existing regulations. Laws may need to be created in order to exempt HARPS from these regulations.

Chapter 4: Operator Licensing – Scope and Content

HARPS Operator Licensees

Consultation Question 3 states, “Do you agree that a HARPS operator license should be required by any business which:

- 1) Carries passengers for hire or reward;
- 2) Using highly automated vehicles;
- 3) On a road;
- 4) Without a human driver or user-in-charge in the vehicle (or in line of site of the vehicle)”

In respect point number one, “business which carries passengers for hire or reward”, you should consider requiring any operator of an autonomous vehicle to obtain a HARPS license, regardless of whether it is a for-profit fleet operator, a non-profit organisation, or individual. Holding each of these groups to the same standards can enable a simplified process and prevent “regulatory shopping”.

In respect of point number three, “on a road”, the inclusion of private roads, such as parking lots, driveways, or airport roads, should also be considered. This may be particularly important for accessibility as it could allow vehicles to drop off handicapped passengers close to their doorstep. Considerations will need to be made as to how to identify when entry on a private road could be permitted.

Community & Other Exemptions

Consultation Question 5 states, “We seek views on whether there should be exemptions for community or other services which would otherwise be within the scope of HARPS operator licensing.”

The below table lists several considerations both for and against exemptions for community or other services:

Considerations for Why There <i>Should</i> be Exemptions for Community or Other Services Which Would Otherwise be Within Scope of HARPS Operator Licensing	Considerations for Why There <i>Should Not</i> be Exemptions for Community or Other Services Which Would Otherwise be Within Scope of HARPS Operator Licensing
<ul style="list-style-type: none"> — In the event of a national disaster or some other emergency which requires an increased need for transportation, such as for an evacuation, it may be beneficial to allow a temporary license to be granted to new operators in order to increase the number of vehicles on the road. In this event, these new operators should likely have to prove some level of competence, such as an operating license in another jurisdiction — If the exemption process is expedited compared to the typical licensing process, operators could begin operations quicker which could enable quicker adoption of HARPS — Peer-to-peer lending schemes, where the vehicle is not made available for public use or “for hire” could be exempt from licensing (unless all operators of a self-driving care are required to have license, which we discuss later) 	<ul style="list-style-type: none"> — A license may need to be required for all operators, regardless of purpose, ensuring that all vehicles on the road can be operated safely. This is model would be similar to the current model for personal driver’s licenses where all individuals must hold a license in order to operate a vehicle — Exemptions could enable “regulatory shopping” — Additional spending would be needed by the HARPS licensing agency in order to oversee and review exemptions — If the exemption process is cumbersome compared to the typical licensing process, it may take longer for operators to begin operations, which could slow the adoption of HARPS

Regardless of whether or not exemptions exist, the process for becoming a licensed operator or exempt operator should be an expedient process without cumbersome barriers to entry so that rapid adoption can be enabled.

Secretary of State Exemptions

Consultation Question 6 states, “We seek views on whether there should be statutory provisions to enable the Secretary of State to exempt specified trials from the need for a HARPS operator license.”

The below table lists several considerations both for and against exemptions by the Secretary of State:

Considerations for Why There <u>Should</u> be Statutory Provisions to Enable the Secretary of State to Exempt Specified Trials from the Need for a HARPS Operator License	Considerations for Why There <u>Should Not</u> be Statutory Provisions to Enable the Secretary of State to Exempt Specified Trials from the Need for a HARPS Operator License
<ul style="list-style-type: none"> — If the exemption process is quicker than the typical licensing process, innovation may be achieved at a quicker pace as operators are able to test ideas quicker — Allowing exceptions would be in line with creating flexible regulation that creates broad guidelines whilst facilitating testing of new capabilities and business models 	<ul style="list-style-type: none"> — If the exemption process is slower than the typical licensing process, innovation may be stifled as operators are not able to test ideas quickly — The Secretary of State may have differing priorities than that of the licensing agency setting general licensing standards which could create multiple sets of standards for vehicles on the road

For any type of trial, particularly if granted an exemption from a HARPS license, there should be consideration as to placing restrictions on items such as time, operations, and location, effectively creating a regulatory sandbox in which innovation can take place but in a controlled and safe environment. A time-limit on the trial could ensure that there is a clear end-point for the operations of the trial and that operations that do not meet the typical regulatory requirements do not continue indefinitely. Operations restrictions could include requiring operators to notify any potential users of those vehicles prior to riding in that vehicle that the vehicle is a part of a trial and clearly state any potential risks associated with that trial. Lastly, location restrictions could require trials to occur only on private, not public roads or on certain designated public roads. France has developed similar legislation which limits the time and location of autonomous vehicle trials on roads to help minimise risk to the public.^{xxvi} The Netherlands has also developed legislation which allows testing on public roads, subject to several conditions including road location, duration, a demonstration of reduced traffic safety risks, and the existence of a driver’s license for any remote operator.^{xxvii}

Operator Requirements

Consultation Question 7 states, “Do you agree that a HARPS operator should show that they:

- 1) Are of good repute;
- 2) Have appropriate financial standing;
- 3) Have suitable premises, including a stable establishment in Great Britain; and
- 4) Have a suitable transport manager to oversee operations?”

In respect of point number one, “are of good repute”, it may be difficult to consistently apply this standard to operators seeking licenses, particularly as many of those seeking licenses will likely be entirely new companies. Instead, you might consider trying to require this demonstration after initial licensing by instituting some sort of points system, similar to that of individual driver’s licenses^{xxviii} wherein points are awarded to an operator’s license when an infraction occurs, based on the severity of the infraction. When a certain number of points are reached for a HARPS operator, the operators licensing can be temporarily suspended or revoked. In this situation, it should then be considered for what infractions points are assigned. Currently, points are assigned to individual licenses based on infractions to the Road Traffic Act^{xxix} for things such as careless driving, driving an uninsured vehicle, or failure to comply with traffic light signals.^{xxx} Points for HARPS operators may include similar infractions against the Road Traffic Act, but may also include points for infringements against consumer protection or accessibility compliance.

In respect of point number two, “have appropriate financial standing”, enforcing this can also be difficult in a future environment. Currently, two of largest ridesharing companies in the world, Uber and Lyft, are not profitable.^{xxxi} Ridesharing companies are currently following a different business model than traditional transportation companies and using a financial standing measure as a prerequisite for a license could exclude them and stifle adoption of HARPS. It could be possible to require operators to show appropriate financial standing by demonstrating they have the financial ability to:

- Run booked services
- Maintain vehicles
- Cover indemnities and liabilities (e.g., public liability insurance)
- Issue refunds and/or compensation, as necessary

In respect of point number three, “have suitable premises, including a stable establishment in Great Britain”, it may also be difficult to enforce this requirement. Uber for example, owns very few assets, as vehicles are owned by its drivers which are contractors with the company.^{xxxii} Other businesses in the future may follow a similar business model, and thus, would not have any premises or type of establishment in Great Britain. Additionally, not requiring an establishment in Great Britain may allow other international companies to quickly insert their operations within the British market and enable expedited adoption and growth of HARPS. If the intention of this requirement is to ensure that the operator has the ability to maintain its vehicles, a physical presence is likely not required as the operator will likely be responsible for assuring there are adequate arrangements to maintain the vehicles regardless of physical presence through other legislation. If the intention of this requirement is to ensure a tax presence in the UK, then this legislation would likely fall under the purview of customs legislation. It could, thus, be considered not to make this a requirement for licensure.

In respect of point number four, “have a suitable transport manager to oversee operations”, the level at which an HARPS operator license is granted will need to be considered. You will need to determine if (1) the license should be granted at a company-level as long as they can prove they have a suitable transport manager to oversee operations or if (2) the license will be granted at an individual-level, and companies will just need to hire licensed operators in order to operate their fleet. This decision will also need to consider if individuals are also being granted operator licenses to operate their personal vehicles. It should also be considered whether there is a certain number of vehicles that a person should be permitted to operate at any given time. For example, if a company wants to operate 300 vehicles at a given time, the law may need to restrict the number of vehicles one individual can see to 100 and require that the company hire three suitable or licensed operators in order to operate 300 vehicles at a given time (note that these numbers were selected arbitrarily for the purposes of this example). If technology solutions are developed that fulfil the role of a transport manager these should be permitted subject to meeting the same obligations as a human operator but, additionally, having sufficient provisions for disengagement and override by human control if required, and requirements to retain fault and error logs.

Professional Competence

Consultation Question 8 states, “How should a transport manager demonstrate professional competence in running an automated service?”

As mentioned above in response to Consultation Question 7, there is a possibility that the role of a transport manager is no longer needed in a future environment, having been replaced by other technology solutions. If a transport manager is to be required, there could be some form of measurements to determine that an individual is capable of operating an autonomous vehicle. This could result in some sort of test that individuals must take, testing for adequate knowledge of HARPS rules and regulations, including topics such as:

- Rules of the road
- Insurance requirements
- Safety requirements
- Vehicle maintenance requirements
- Roadworthiness
- Cyber-security
- Vehicle registration and certification
- Accident reporting

Adequate Arrangements for Maintenance

Consultation Question 9 states, “Do you agree that HARPS operators should:

- 1) Be under a legal obligation to ensure roadworthiness; and
- 2) Demonstrate ‘adequate facilities or arrangements’ for maintaining vehicles and operating systems” in a fit and serviceable condition?”

In respect of point one, “be under a legal obligation to ensure roadworthiness”, see response above in respect of Chapter 3, where we discuss why roadworthiness will likely be the responsibility of the HARPS operator.

In respect of point two, “adequate facilities or arrangements”, the below table lists several considerations both for and against demonstrating adequate facilities or arrangements:

Considerations for Why HARPS Operators <i>Should</i> be Required to Demonstrate Adequate Facilities or Arrangements for Maintaining Vehicles	Considerations for Why HARPS Operators <i>Should Not</i> be Required to Demonstrate Adequate Facilities or Arrangements for Maintaining Vehicles
<ul style="list-style-type: none"> — As operators will hold the responsibility of maintaining their vehicles and will, therefore, need to have maintenance facilities or arrangements, reporting these could require minimal additional effort 	<ul style="list-style-type: none"> — As operators will hold the responsibility of maintaining their vehicles, demonstrating this ability may be redundant in nature — Demonstrating that the existence of adequate facilities or arrangements does not necessarily mean maintenance is being done appropriately and, thus, may not be the best measure for the completion of appropriate maintenance — If HARPS work correctly, vehicles will pull over and stop safely when an issue is detected. It can then be up to the vehicle owner or operator to decide if they would like to have the vehicle maintained and put back in service

Operators as Users

Consultation Question 10 states, “Do you agree that legislation should be amended to clarify that HARPS operators are ‘users’ for the purposes of insurance and roadworthiness?”

As stated above, it is likely that the operators will be responsible for insuring the vehicles and, most often, roadworthiness. As such, it could be considered to amend legislation to define operators as “users” for these purposes. This aligns with the UK’s Automated and Electric Vehicles Act 2018, wherein there is a distinction between the vehicle “insurer”, likely the vehicle operator, and the vehicle “owner”.^{xxxiii}

HARPS Operator Duties

Consultation Question 11 states, “Do you agree that HARPS operators should have a legal duty to:

- 1) Insure vehicles;
- 2) Supervise vehicles;
- 3) Report accidents; and
- 4) Take reasonable steps to safeguard passengers from assault, abuse, or harassment?”

In respect of point one, “insure vehicles”, please see response above relating to Chapter 3, where we discuss why insuring vehicles will likely be the duty of both the operator and owner.

In respect of point two, “supervise vehicles”, the term “supervise” should be clearly defined. The HARPS operator could be legally responsible for supervising their specific vehicles to ensure:

- Vehicles are following all applicable laws
- Roadworthiness of each vehicle
- Ensure that any broken-down vehicles are promptly moved off the roads
- Promptly report any accidents

There could possibly be another supervisory role played by some form of a government agency, similar to that of air traffic controllers, which could, in real time, adjust speeds on streets, redirect traffic, and create clear paths for emergency vehicles. This agency would be supervising the entire system, while HARPS operators would be supervising their own specific vehicles within that system.

In respect of point three, “report accidents”, the HARPS operator could be required to report any accidents to the police and their insurance company, similar to current requirements.^{xxxiv} In the future, the operator may also be required to report the accident to the central agency that oversees the whole system so that the agency can determine if vehicles need to be rerouted away from the incident. This could also allow the central agency to develop learnings from the accidents in order to better assess the safety of the models or all operators within the system.

In respect of point four, “take reasonable steps to safeguard passengers from assault, abuse, or harassment”, operators could, indeed, have some level of responsibility for this, such as ensuring that their vehicles do not have any unauthorized riders. For example, the operator may be required to ensure that passengers do not remain in vehicles beyond their original trip such that they could be already be in a vehicle when a new passenger commences their trip. As many of these trips will be shared trips, however, you might consider requiring operators to give passengers a feature that would allow them to discretely stop and exit the vehicle as soon as it is safe if they feel they are in danger. Operators could also be given the ability to suspend or ban riders from their services if they are found to have committed assault, abuse, or harassment in the operator’s vehicles at the operator’s discretion.

Operators may also be required to complete reasonable checks within their vehicles to ensure that previous passengers did not leave any hidden cameras, bugs, or tracking devices in order to protect the privacy of passengers.

Additionally, there may be a requirement for operators to ensure the suitability of mechanics providing repairs to vehicles given their potential impact on the safety of passengers. In the United States, the FAA requires employers to conduct background and drug/alcohol checks on personnel as a safety measure.^{xxxv} Similar requirements could be created for HARPS mechanics and any other personal who may have an impact on the safety of passengers.

Regulating Prices

You state, “We do not propose to regulate fares for HARPS. Instead we think that consumers should have the opportunity to compare prices before booking.”

The table below lists several considerations both for and against regulating prices:

Considerations for Why HARPS <i>Should</i> Have Regulated Prices	Considerations for Why HARPS <i>Should Not</i> Have Regulated Prices
<ul style="list-style-type: none"> — Could enable accessible prices for all income levels — If fares are unregulated, operators could collude to set prices artificially high — Could prevent the creation of any monopolies and ensure competition — Could incentivise operators to gain a competitive advantage through measures other than price, such as customer service — Pricing can be used to manage congestion and encourage use of environmentally friendly modes 	<ul style="list-style-type: none"> — Could enable lower prices through greater competition — If regulated prices are set too high, then supply will exceed demand and growth of HARPS could be stifled — If regulated prices are set too low, then demand will exceed supply and riders could be left without a ride — Could create a greater variety of services, allowing some operators to provide more affordable rides while others provide more luxurious rides — Allows operators to manage revenue risk — Road user charging and tolling can be used as effective incentives to encourage certain behaviours in lieu of regulated prices

An important point to note is that even regulated prices could still include dynamic pricing, a feature popular with current ridesharing companies such as Uber.^{xxxvi} This could be achieved through a central body setting the sure pricing or even through setting maximums or designating a range of prices for which operators can then set their own prices within those boundaries. For a list of potential benefits and detriments to dynamic pricing, please see Appendix A.

Price Information

Consultation Question 14 states, “We invite views on whether the HARPS operator licensing agency should...have powers to:

- 1) Issue guidance about how to provide clear and comparable price information; and/or
- 2) Withdraw the license of an operator who failed to give price information”

In respect of point one, “issue guidance about how to provide clear and comparable price information”, the below table lists several considerations both for and against the HARPS operator licensing agency having powers to issue guidance on price information:

Considerations for Why the HARPS Operator Licensing Agency <i>Should</i> Have Powers to Issue Guidance About How to Provide Clear and Comparable Price Information	Considerations for Why the HARPS Operator Licensing Agency <i>Should Not</i> Have Powers to Issue Guidance About How to Provide Clear and Comparable Price Information
<ul style="list-style-type: none"> — Setting requirements for the display of pricing could make it easier for consumers to quickly compare providers and make more informed decisions — Creating comparable prices could prevent operators from gaining a competitive advantage through pricing display and encourage operators to seek other ways to gain a competitive advantage, such as improved customer service or lower prices — In a 100% autonomous vehicle environment, it could be much easier to predict the total cost to the passenger as it could be easier to predict travel times and route — Could prevent any hidden fees from being placed onto passengers during the trip that they were not aware of prior to booking the trip 	<ul style="list-style-type: none"> — Operators may be using complex formulas to determine the pricing of their rides and the actual cost could vary significantly compared to the estimated cost depending on the actual journey, especially in a shared-road environment where it could be more difficult to predict travel times and route — Poor pricing information could simply result in customers not wanting to use that operator again in the future

In the U.S., many states require retailers to display a product’s price per unit or price per weight in order to provide more comparable pricing across products.^{xxxvii} A similar concept could be applied to HARPS where even though different operators may have a different price per mile or price per minute, the operators could be required to display this cost along with an estimated total cost for the trip.

In respect of point two, “withdraw the license of an operator who failed to give price information”, this could be treated as an infraction within the points system as discussed above in our response to Chapter 4, Consultation Question 7 wherein points are awarded to an operator based on certain infractions and after certain thresholds for points licenses can be suspended or revoked.

Chapter 5: Privately-Owned Passenger-Only Vehicles

Private Licensing

Consultation Question 17 states, “Do you agree that those making ‘passenger-only’ vehicles available to the public should be licensed as HARPS operators unless the arrangement provides a vehicle for exclusive use for an initial period of at least six months?”

It should be considered that an operator of a HARPS vehicle be defined broadly, such that any agency or individual that is considered to be operating a HARPS vehicle, regardless of ownership or personal- or public-use, is required to possess a license. For example, consider the fact that there is very little difference between an individual riding in their privately-owned vehicle with another passenger compared to an individual making that same vehicle available for other passengers to use without the vehicle owner riding in the car. The key distinguishing factor in this case could be the fact that the owner is making the vehicle available “for hire”, and as such, could be subject to meeting certain regulations or requirements in addition to holding a HARPS license.

Private Licensing Responsibilities

Consultation Question 18 states, “Do you agree that where a passenger-only vehicle is not operated as a HARPS, the person who keeps the vehicle should be responsible for:

- 1) Insuring the vehicle;
- 2) Keeping the vehicle roadworthy;
- 3) Installing safety-critical updates;
- 4) Reporting accidents; and
- 5) Removing the vehicle if it causes an obstruction or is left in a prohibited place?”

As stated above in various responses to Chapter 3 and Chapter 4, responsibilities for these various elements could likely be as follows in the future, regardless of whether the vehicle is treated as a HARPS vehicle or used privately only:

Responsibility Area	Scenario 1: Personal-Owned Vehicle	Scenario 2: Personal-Leased Vehicle	Scenario 3: Company-Owned Vehicle
Insuring	Vehicle Owner ¹	Vehicle Owner ¹	Vehicle Owner ¹
Roadworthiness	Vehicle Operator	Vehicle Operator	Vehicle Operator ²
Critical Updates	Vehicle Owner ³	Vehicle Lessee	Vehicle Owner
Accident Reporting	Vehicle Operator	Vehicle Operator	Vehicle Operator
Vehicle Removal	Vehicle Operator	Vehicle Operator	Vehicle Operator

¹Vehicle Operators will likely also have a duty to hold insurance

²Currently, vehicle operators hold some responsibility for roadworthiness, such as making sure there are regular safety inspections and having a system to ensure that non-roadworthy vehicles are taken out of service^{xxxviii}

³In this scenario, the Vehicle Operator and Vehicle Owner would be the same party

Private Licensing Maintenance

Consultation Question 21 states, “Do you agree that for passenger-only vehicles which are not operated as HARPS, the legislation should include a regulation-making power to require registered keepers to have in place a contract for supervision and maintenance services with a licensed provider?”

Supervision and Maintenance Services should be ancillary provisions that can be procured by choice, and should not be enforced by regulation. If the HARPS works correctly and pulls over safely if it has to and the operator does not have a supervisory contract which enables an individual or system to remotely move the vehicle, authorised response services should be able to re-locate the vehicle (e.g. away from live traffic). Accordingly provisions should be in place in regulation to enable emergency services or authorised third parties to take remote control of a vehicle - with the operator’s permission - in order to move it. If an operator is charged by the recovering party for moving the vehicle this will likely incentivise operators to take out supervision contracts. Likewise, it’s the responsibility of the owner/operator based on their own risk acceptance whether they wish to procure maintenance services..

Chapter 6: Accessibility

Accessibility Objectives

Consultation Question 24 states, “We seek views on how regulation can promote the accessibility of [HARPS]. In particular, we seek views on the key benefits and concerns that regulation should address.”

Research from the World Health Organization (WHO) showed that approximately 15.3% of people across the world have a moderate or severe disability. This research also showed that of those aged 60 years or more, approximately 46% had a moderate or severe disability.^{xxxix} Policy sponsored by the United Nations defines accessibility “both as a humans rights and a development concern...[not] only a means and a goal of inclusive development but also an enabler of an improved, participative economic and social environment for all members of society.”^{xi}

In the UK, there are significant current challenges around accessible mobility. In London, for example, disabled travellers make 27% less trips than non-disabled travellers and are 33% less likely to hold a driver’s license.^{xii} This is a result of a myriad of challenges in accessing transportation. Only 28% of Underground stations in the city have step-free access and 77% of those stations with step-free access experiences problems with lifts in 2018.^{xiii} Uber has deployed wheelchair accessible vehicles in the city; however, the availability of these vehicles is significantly lower compared to its non-accessible vehicles.^{xiiii}

Closing this 27% transportation between disabled and non-disabled passengers will require improvements to transportation accessibility. The International Transport Forum defines improved accessibility in relation to mobility as two-fold: “either [1] an improvement that results in greater access to transport vehicles, or; [2] an improvement that improves access to destinations, increases participation, and generates new trips.”^{xliv}

HARPS is uniquely positioned be able to improve accessibility in both of these ways and reap many of the potential benefits of improved accessibility. These benefits are not limited to just improved lives of disabled riders, but also include greater impacts on things like non-disabled riders, transport operators, and the economy. Some examples of these benefits are as follows:

- Ability for disabled persons to access services, including health, education, and leisure^{xlv}
- Greater inclusion for disabled persons, helping prevent isolation and associated increased risks of psychological problems^{xlvi}
- Increased health for disabled persons as active travel modes can support healthier lifestyles^{xlvii}
- Reduced travel times for all passengers (disabled or non-disabled) as boarding and egress time is improved in addition to improved signage and information^{xlviii}
- Reduced travel time for disabled persons with the introduction of accessible ticketing machines^{xlix}
- Decongestion with a modal shift from private, motorised vehicles towards public transport^l
- Increased willingness to pay for accessibility improvements as individuals realise the potential value to themselves if were to become disabled in the future due to age or an injury^{li}
- Increased revenue potential for operators through increased ridership of disabled passengers^{lii}
- Cost reductions for operators if disabled passengers can access transport more independently rather than relying on dedicated staff from the operator^{liii}
- Greater participation for disabled persons in social and economic activities^{liv}
- Reduction in pay gap between disabled and non-disabled persons which in 2018 was 15.3% in London and 8.3% in Scotland^{lv}

The International Transport Forum provides a framework the benefits of accessibility as well as a framework for measuring the benefits of accessibility. These can be found in Appendix B and Appendix C, respectively.

Specific Accessibility Outcomes

Consultation Question 26 states, “We seek views on how regulation could address the challenges posed by the absence of a driver, and the crucial role drivers play in order to deliver safe and accessible journeys. For example, should provision be made for:

- 1) Ensuring passengers can board and alight vehicles?
- 2) Requiring reassurance when there is a disruption and accessible information?
- 3) Expansion of support at designated points of departure and arrival?”

In respect of point one, “ensuring passengers can board and alight vehicles”, there is likely some sort of “reasonability” that could be applied, similar to that which is required by the Equality Act 2010.^{lvi} In the context of HARPS, “reasonability” in respect of boarding and alighting vehicles should include not only assistance for passengers physically boarding and alighting the vehicle, but also support for loading and unloading items such as wheelchairs or luggage. For example, the operator may need to ensure that the design of the vehicle has reasonable measures to enable boarding and alighting the vehicle; however, they may not be required to ensure that there is an individual at both ends of the trip to assist with the process. The provision of an individual at both ends of the trip may, instead, fall under an enhanced

service that the government may fund. Operators may, however, be required to ensure that there is enough room in the vehicle for both the disabled passenger and another individual, or “Carer”, so that the Carer can help with boarding and alighting. There is even a potential to require operators to offer these Carers a free or discounted ride. Consideration should also be given to ensure that there is enough space and accessible fares provide for passengers who require assistance animals. Thus, in respect of point three, “expansion of support at designated points of departure and arrival”, operators will likely not be responsible for expanding their support at these points.

In respect of point two, “requiring reassurance when there is a disruption and accessible information”, defining “accessible information” is important. The definition should include not only what information should be considered critical for all passengers, such as location, time schedules, or disruption in services, but should also consider how that information is displayed such that all passengers can obtain it. The International Transport Forum recommends that all information, both audio and visual, should meet the four following criteria:

1. Clear
2. Concise
3. Accurate
4. Timely^{lvii}

Regulation could be created to further define each of these terms in the context of HARPS and operators be required to adhere to them when disseminating information.

Further consideration should be given to requiring operators to provide information about the accessibility of the destination on a trip. Building owners could be required to provide a central body with key information regarding accessibility and operators could be required to provide this information through their platforms. This could allow passengers to understand the accessibility of their whole journey, rather than just one segment of it.

Accessibility as a Condition of Licensure

You state that requiring operators to conform with the Equality Act of 2010 “could be a more direct and effective route to redress than court proceedings which can be expensive and take a long time.”

While it is a worthwhile consideration to make conforming with this act a requirement of licensure, possibly awarding points for certain infractions against the Act, as discussed in response to Chapter 4, Consultation Question 7, the potential for it, or any other licensure requirement, to be a more effective route than court proceedings may not hold true. For example, in 2017 TfL removed Uber’s operating license in London for not complying with various license requirements; however, Uber subsequently took the matter to court.^{lviii} While it may still be worth creating these requirements, it may create potential savings from eliminating or reducing court proceedings.

Additionally, there should be consideration given as to whether those with privately-owned vehicles participating in peer-to-peer lending scheme that do not make vehicles available to the public “for hire” should also be required to conform with the Equality Act of 2010 or if they should have the ability to decide who they lend to without recrimination.

Vehicle Increases

You state, “One concern is that once ‘passenger-only’ vehicles have received regulatory approval, large numbers of new vehicles will be placed on the road, adding to congestion and pollution.”

This is indeed a valid concern as vehicle miles travelled (VMT) is expected to increase with the adoption of self-driving vehicles^{lix}, contributing to congestion and pollution. This will be particularly relevant in the short-term as autonomous vehicles share the road with non-autonomous vehicles and cannot be fully optimised to reduce congestion and pollution. As operators receive licenses, it is indeed likely they will introduce a significant number of cars on the roads to try to meet the demand set by customers.

It is difficult to predict how many of these vehicles will replace current vehicles on the road and how many additional vehicles it will create compared to today. As such, there are a couple of options legislatively which could minimise the number of vehicles on the road. One option would be to limit the number of vehicles on the road, which we will discuss in our response to Consultation Question 32 below. Another option would be to create a road user charging structure which encouraged more shared rides by offering lower prices for vehicles with multiple passengers, which we will discuss in response to Consultation Questions 33 and 34 below.

Similar considerations should also be given to freight vehicles in addition to passenger-only vehicles as freight vehicles are also expected to contribute to an increase in VMT and related congestion and pollution.

Zero-Passenger Trips

Additionally, you state, “Where the cost of driving is less than the cost of parking, there is a danger [that] HARPS will ‘cruise’ that is, circle around empty for no reason except to wait for the next booking.”

This, too, is a valid concern. Even before considering parking, consider the vehicles travelling between trips. In 2017, taxis, transportation network companies (like Uber and Lyft), and private cars spend approximately 38% of their time driving without a passenger between trips.^{lx} While algorithms will likely continue to improve to reduce the time spent driving between trips without a passenger, legislation may be required to ensure a reduction in zero passenger trips, particularly if the cost of parking is more expensive than driving the vehicle around without a passenger.

There are several legislative options which could be considered to help minimise zero-passenger trips. One option could be to charge operators for a mileage-based or some other type of fee for all distance or time travelled without a passenger. Operators would likely push these costs onto customers, however, increasing the cost of HARPS but potentially creating opportunities for operators to gain a competitive pricing advantage by minimising this cost. This could also help establish a model which would disincentivise oversupply of vehicles as operators would be incentivised to have an appropriate number of vehicles on the road to keep their vehicles full, rather than paying additional fees by having extra vehicles driving around without passengers. An additional option would be to integrate all operators as we discuss in Scenario 3 of our response to Chapter 8, Consultation Question 38, wherein operators

essentially are operating unbranded vehicles within a greater HARPS system. A central body would be responsible for dispatching trips to operators, which could help reduce zero-passenger trips as the dispatcher could simply link a rider to the closest car, rather than a rider selecting a specific operator whose vehicles may be farther away than another operator and would require more zero-passenger miles and time to pick up the passenger.

Traffic Regulation Orders

Consultation Question 29 states, “We seek views on whether the law on traffic regulation orders needs specific changes to respond to the challenge of HARPS.”

We agree that the DfT’s review of the legislation of traffic orders is a necessary step to simplify the process to create TROs. While we cannot comment on the specificities of the legislation or regulation, the legislation should be broad enough to provide overall direction for the country while still permitting individual jurisdictions to take into account their own specific requirements. A consistent approach towards traffic regulation in England, Scotland, and Wales could give the UK a competitive advantage from a policy perspective vis-à-vis larger nations with federal structures, such as the United States, where manufacturers are struggling with the patchwork of traffic rules across different states.^{lxvi}

Regulating Use of the Curb-Side

Consultation Question 30 states, “We welcome views on possible barriers to adapting existing parking provisions and charges to deal with the introduction of HARPS. In particular, should section 122 of the Road Traffic Regulation Act 1984 be amended to expressly allow traffic authorities to take account of a wider range of considerations when setting parking charges for HARPS vehicles.”

Under the current Road Traffic Regulation Act 1984, in England and Wales, the central government is responsible for the management of parking on major trunk roads while local authorities are responsible for local roads. These authorities are permitted to fix the charge at any level as long as they are “relieving or preventing congestion or traffic”. They are not allowed to set charges with the objective of raising revenues even if these are channelled back into road management. With conventional vehicles that are currently on the roads, the authorities have several decades of data and experience to set appropriate prices; however, with autonomous vehicles, there is currently uncertainty around the pace of adoption, as well as commercial and customer behaviour; thus, making the prediction or demonstration of any impact on congestion difficult.

In respect of amending 122 of the Road Traffic Regulation Act 1984, we believe that congestion control should be the main policy objective of setting parking charges for HARPS vehicles and has been appropriately prioritised in the Act; however, you could consider organising cross-stakeholder discussions with representation from various parties, including Highways England, Local Authorities, DfT, the British Parking Association, the Automotive Council, freight associations, and consumer groups to deliberate on whether other policy objectives should be considered over time. The broader Act may also have to be amended in the long-term to allow for dynamic curb-side management.

Balancing Road Pricing and Parking Charges

Consultation Question 31 states, “We seek views on the appropriate balance between road pricing and parking charges to ensure the successful deployment of HARPS.”

While it is critical to see these two interventions in conjunction, it is likely that there is currently insufficient data and experimentation in a UK context to answer this question. You or the Centre for Connected and Autonomous Vehicles should consider conducting a detailed economic and spatial assessment in the UK context of the likely effect of autonomous vehicle adoption on road use and congestion. Currently, there are several international modelling studies that explore this question^{lxii}, but they are unlikely to have enough external validity to be applied to the setting of specific charges in the UK.

Road Pricing

Consultation Question 32 states, “Should transport authorities have new statutory powers to establish road pricing schemes specifically for HARPS? If so, we welcome views on:

- 1) The procedure for establish such schemes;
- 2) The permitted purposes of such schemes; and
- 3) What limits should be placed on how funds are used.”

Road pricing will be critical for controlling congestion, not only for HARPS, but for road transport more broadly and should be examined urgently. Politically, with the government under pressure to bring the Net Zero target from 2050 to 2032 and reduce road fatalities, road pricing could go a long way in managing demand. Additionally, there is an economic imperative for this as with increasing adoption of electric vehicles, the government will have to look beyond the fuel duty. Technologically, road users are becoming more tech-savvy and technologies such as digital payments could be adopted into a road user charging system. From the perspective of road users, there are a number of conflicting driving factors. On the one hand, a road pricing system could help reduce traffic, provide a convenient and seamless way to pay charges, and create a progressive charging ecosystem to replace the patchwork of taxes currently being paid. On the other hand, road pricing schemes are politically unpopular and one of the key concerns for customers is data privacy.

Within this context, road pricing interventions for HARPS would likely need to be aligned with the wider ecosystem of vehicle charging mechanisms such as congestion charging, tolling and charging interventions (e.g., the M25 Dartford Crossing), Clean Air Zones, and the potential phasing-out of fuel taxes. Alignment with these other mechanisms can enable all types of vehicles, including automated, electric, both electric and automated, and conventional are charged based on their burden on the ecosystem. In respect of the process, various stakeholders like the DfT, Highways England, and local authorities will need to be convened. Again, freight transport will have to be viewed alongside passenger transport. Increasing adoption of connected and autonomous vehicles will provide an opportunity to integrate with other systems like connected vehicle technologies, automated vehicle recognition, and 5G. The Information Technology & Innovation Foundation (ITIF) in the United States has developed “A Policymaker’s Guide to Road User Charges” which may be useful to reference.^{lxiii}

Quantity Restrictions

Consultation Question 34 states, “Do you agree that there should be no powers to impose quantity restrictions on the total number of HARPS operators in a given area?”

We agree that it is too premature for the UK to introduce a drastic regulation like quantity restrictions on the total number of HARPS in a given area, particularly at a time that it is trying to create a conducive environment for investment and innovation. Similar quantity-restricting regulations like the taxi-medallion system in New York has led to artificial inflation in the market^{lxiv}, which is best avoided at this stage. Currently, to our knowledge, no other country has prescribed such regulation for autonomous vehicles. Instead, to combat the potential market failure of increased VMT, the other regulations suggested above, such as appropriate road or parking prices, may be more appropriate.

We would extend the same logic to Consultation Question 33 which states, “Do you agree that the agency that licenses HARPS operators should have flexible powers to limit the number of vehicles any given operator can use within a given operational design domain for an initial period? If so, how long should the period be?”

While providing a free rein to manufacturers might result in them ‘dumping’ their products in the market to stymie competition, specifying the powers of the agency to regulate quantity at this stage may be premature. The experiences of other countries in which there has been greater adoption—for instance, Singapore^{lxv}—does not yet suggest that monopoly regulation of this nature is required. Instead, the UK should consider limiting the possibility of monopoly creation from first principle by creating the right environment for innovation and investment, similar to global leaders like Singapore and the Netherlands^{lxvi}.

Fundamentally, however, we, as both an industry and society, need to re-assess whether there really is a need for instant gratification of mobility that can be provided by HARPS, particularly when there is an unlimited number of vehicles allowed. In the long-term, we may consider limiting the number of vehicles on the road, instead encouraging other modes such as walking or mass-transit or requiring longer waits to use a HARPS vehicle. The trade-off for instant gratification can be replaced realising other benefits, such as reduced congestion and pollution and safer streets.

Chapter 8: Integrating HARPS with Public Transport

Multi-Modal Incentivisation

You state, “HARPS have the power to reduce congestion by increasing the number of “multi-modal trips...however, there is a danger that once people get into a single-occupancy HARPS they will take it to their final city centre destination.”

There are a couple of potential legislative options which could help ensure multi-modal trips. One option would be to provide reduced fares for trips beginning or ending at a public transit station. Though this could be achieved through controlling HARPS pricing, considerations of which are given in our response to this topic in Chapter 4, this can also be achieved in an unregulated price environment through providing a subsidy on these rides. In the U.S., cities have provided various levels of these subsidies for Uber and Lyft rides commencing or ending at public transit stations in an attempt to encourage multi-modal trips.^{lxvii}

Another option could be to ban the operations of HARPS vehicles in certain areas within a city, requiring passengers to instead connect to public transit services. Several cities within the UK have already begun banning vehicles in certain city centres to make way for more pedestrians and cyclists.^{lxviii}

Bus Regulation

Consultation Questions 35, 36, and 37, at their core, are asking whether HARPS, under certain conditions, such as transporting more than eight passengers or running with some degree of regularity with fixed points, should be subject to bus regulations. The below table lists several considerations both for and against the subjecting HARPS to bus regulations under certain conditions:

Considerations for Why HARPS <u>Should</u> be Subject to Bus Regulations Under Certain Conditions	Considerations for Why HARPS <u>Should Not</u> be Subject to Bus Regulations Under Certain Conditions
<ul style="list-style-type: none"> — Would align with current power of local authorities to grant operating licenses to busses^{lxix} — HARPS may have similar characteristics to busses but would not be subject to the same regulation as busses which for some period, will share the same roads 	<ul style="list-style-type: none"> — Subjecting large-passenger HARPS to bus regulations could encourage the production of vehicles that carry less passengers in order to avoid bus regulations, requiring more vehicles to transport the same number of passengers, increasing congestion and carbon emissions — An intentional difference in regulation between busses and HARPS could encourage bus operators to switch to HARPS operators (large- or small-passenger) in the long-term and remove non-autonomous vehicles off the road

In New York City, a recent study found that large-capacity, 10-person ridesharing vehicles could meet 98% of the city’s demand for taxis using a fleet of only 2,000 instead of the current 13,000.^{lxx} Thus, it should be considered whether treating large-passenger HARPS as busses for regulatory purposes would provide the best chance of these potential benefits. Additionally, it should be considered if the definition of a “bus” or any other classification of vehicles based on size should be eliminated as vehicles are increasingly growing in capacity, making these distinctions potentially outdated and irrelevant.

Joint Services

Consultation Questions 38 states, “We seek views on a new statutory scheme by which a transport authority that provides facilities for HARPS could place requirements on operators to participate in joint marketing, ticketing, and information platforms.”

This can be considered based on three potential scenarios:

- “Independent” – Otherwise known as “Fully Deregulated” in the current bus market
- “Joint Effort” – Otherwise known as “Quality Partnership” in the current bus market
- “Fully Integrated” – Otherwise known as “Regulated” or “Franchised/Concessioned” in the current bus market

In the context of HARPS each of these scenarios would present varying levels of joint requirements on operators:

Factor	Scenario 1: Independent	Scenario 2: Joint Efforts	Scenario 3: Fully Integrated
Marketing			✓
Ticketing			✓
Information Platforms		✓	✓
Ride Requesting		✓	✓
Pricing			✓
Dispatching			✓

In Scenario 1, “Independent”, HARPS operators Are not required to provide any joint services. They are fully funded by their customers and receive no subsidies from the local authority. Operators do have the ability to adopt shared practices for some of these factors, such as a payment or ticketing platform, in order to increase their target audience; however, this is not mandated and they can do this at their discretion.

In Scenario 2, “Joint Efforts”, HARPS operators are required to jointly provide information platforms and ride requesting. By jointly providing information, customers know exactly where to look to obtain key information on the system, such as how to use it, hours of operations, costs, delays, and emergency information. This system would likely need to be maintained by some sort of central government body with the operators providing information to the central body. By jointly providing ride requesting, customers could also have one location where they could go to request rides, thus enabling them to more easily compare their options across operators. This could encourage greater competition amongst operators and result in better prices and services to passengers.

In Scenario 3, “Fully Integrated”, HARPS operators essentially are operating unbranded vehicles within a greater HARPS system. Customers go to one place to view information and request rides while a central government agency remains responsible for setting prices and dispatching rides to operators for completion. Operators are paid for providing their services and remain responsible for things such as vehicle maintenance, insurance, accident reporting, and roadworthiness. Note that in this scenario, it is also possible for the central agency to outsource the dispatching function to another body.

Other Considerations

Broader Accessibility

The scope of accessibility should not just be limited to those with disabilities. It should also consider other social factors such as race, income, or internet and mobile access which can make mobility more challenging or inequitable.

Race can often play a factor in whether or not an individual has access to transportation. Taxis and ridesharing has been shown to discriminate against riders by cancelling at higher rates for black riders.^{lxxi} Even though in the future, there will not be a driver which can discriminate against potential riders, algorithms have been shown to also demonstrate discrimination.^{lxxii} Legislation could be created to ensure that the algorithms used for things like dispatching and pricing rides does not discriminate based on race.

Income can also play a factor in whether or not an individual has access to transportation. In England alone, over 1.5 million people are considered to be living in “transport poverty”, which is a combination of three factors: (1) living in an area of low income making personal car ownership difficult, (2) living in an area where a significant portion of residents live more than a mile from a bus or rail station, and (3) living in an area where it takes over an hour to access essential goods and services by walking, cycling, or public transport.^{lxxiii} Additionally, commuting time has been shown to be the largest factor in the ability to escaping poverty.^{lxxiv} HARPS are uniquely positioned to provide transportation in these “transport poverty” areas and provide people with a better chance of escaping poverty. Legislation could be created to ensure that HARPS provide equitable service in all neighbourhoods and regions, not just in higher income areas. Additionally, legislation could be created to ensure that HARPS remains affordable for all, including those in low income areas.

Income also often has a direct link to whether or not an individual is banked.^{lxxv} In Great Britain alone, over 1.5 million adults are unbanked.^{lxxvi} This means they do not have access to debit or credit cards and would require some sort of other ticketing method in order to pay digitally and access transportation. As HARPS are expected to rely heavily on digital solutions, including digital payment methods, it is, therefore, important to consider requiring operators to provide ticketing options to those who are unbanked.

Internet and mobile access can also play a factor in whether or not an individual has access to transportation, particularly as HARPS will likely rely heavily on a system for requesting rides that is geared towards riders with mobile phones and/or internet access. 10% of the population in Great Britain alone, however, does not have access to internet.^{lxxvii} Additionally, 27% of adults in Great Britain alone do not have or use internet on their mobile phones.^{lxxviii} Legislation could be created to ensure that users without internet or mobile access can still use and obtain information about HARPS.

Shareholder Ownership Schemes and Fleets

As stated in various responses above, the vehicle owner is often responsible for many factors related to the vehicle. There is a potential for operators to be a business created through the investment of stakeholders, which could create multiple owners in the business. Similarly, individuals may purchase a vehicle and elect to have it include as a part of a fleet offering for which the vehicles are made available for hire through an aggregator and operator. As such, legislation may need to clearly define who is considered the “owner” in relation to completing any defined responsibilities in this potential situation.

Stranded Vehicles

As stated above in response to Chapter 5, Consultation Question 18, operators will likely be responsible for vehicle removal if a vehicle is left stranded. Additional legislation should be created to define the obligation that operators have if any passengers are stranded within the car. Not only could this include any requirements for how long they have to respond, but could also include any reparations they must provide to passengers or city rescue functions if they are left stranded for an extended period. This could be particularly important if a vehicle is stranded due to flooding or some other situation where the operator cannot send another vehicle to transfer the passengers to due to road conditions.

Government Licenses

As a part of the consideration whether to grant operator licenses at an entity-level or at an individual-level, you should also consider the potential impact on government agencies which will likely be operating vehicles. If granting licenses at an entity-level, then the government agency would need to comply with all requirements and if found to be non-conforming, could face the removal of their license. This could result in a hold on the delivery of key public services that rely on these vehicles. If granted at the individual-level, then any non-conforming individuals could have their license suspended or removed, but the government agency could hire another licensed individual, ensuring there is no gap in services.

Ban on Driving

In the short-term, self-driving cars will need to share the roads with human drivers; however, a potential long-term goal of self-driving cars is the ability to ban all human driving on public roads. Not only could a ban save lives, as there were over 1,700 reported road deaths in Great Britain alone in 2018^{lxxix}, but it could also encourage and amplify the adoption of self-driving cars, enabling many of the other potential benefits of self-driving cars. As such, considerations should be made for a framework which can be used in order to determine when it appropriate to enact a ban on driving. Many considerations will need to take place and this could likely result in future work for the Law Commissions.

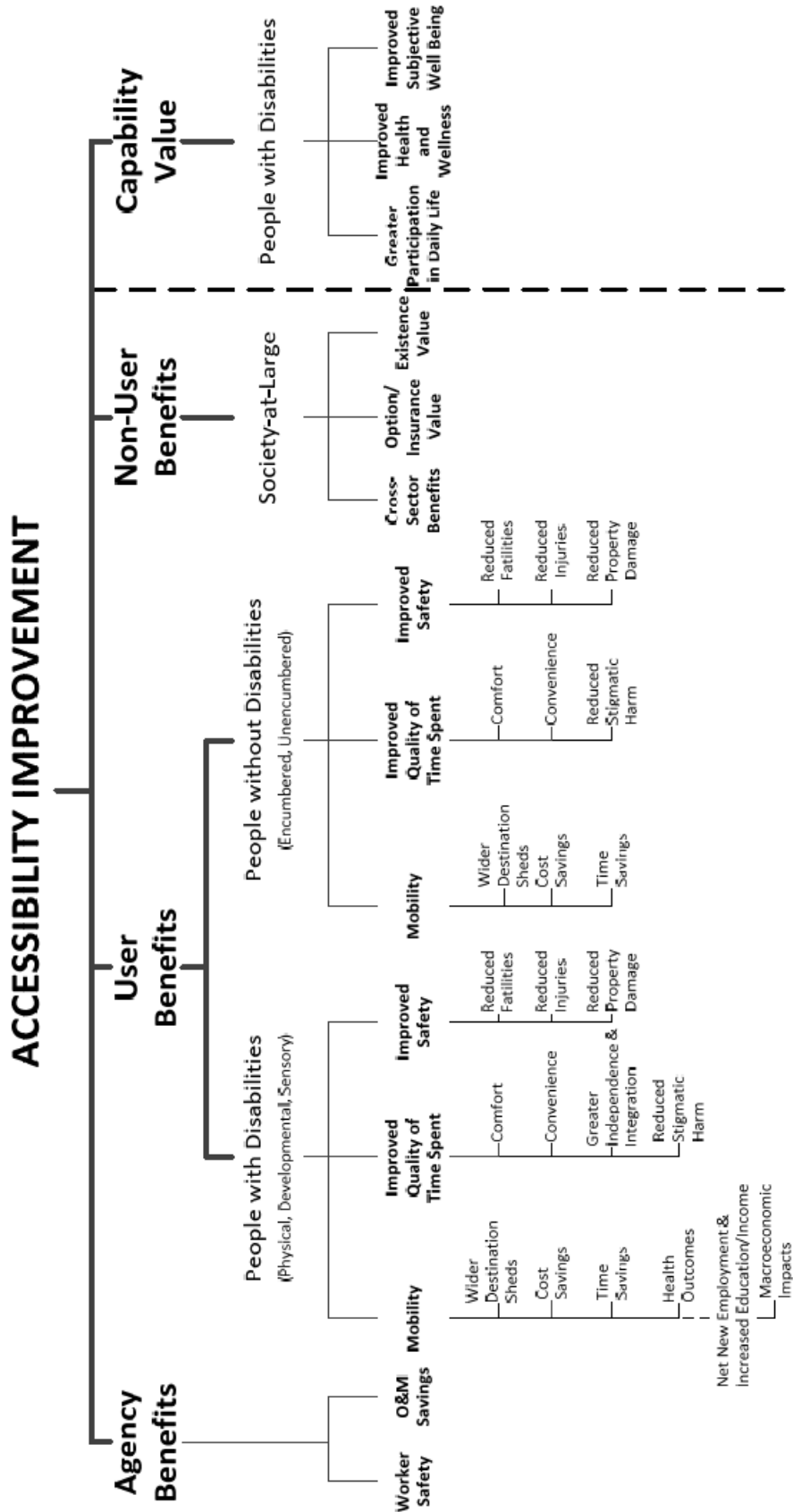
APPENDIX A

Pros and Cons of Dynamic Pricing^{lxxx}

Pros	Cons
<ul style="list-style-type: none">— Firms can increase revenue and enable to run a wider range of services. Without dynamic pricing, it may be harder to get a taxi at a time of the day when taxi drivers don't want to work.— Consumers who travel at unpopular times can benefit from lower prices. If you know off-peak times will be cheaper, it can enable low-income consumers to consume a good; they otherwise wouldn't have.— Varying the price can enable the firm to pay employees a higher wage to work during peak times. This gives a benefit to employers, but equally, it can lead to lower wages during a slump in demand and greater uncertainty over wages.— Dynamic pricing is a way to avoid queues and excess supply. It can smooth consumption over fluctuations in demand. The idea of Uber was that it would prevent periods where you couldn't find a taxi.	<ul style="list-style-type: none">— Consumers who pay the higher price may feel ripped off.— Surge pricing can lead to bad headlines, e.g. high prices during a tragic emergency. (To combat these headlines, firms can place manual limits on the amount prices surge by.)— Consumers may feel they cannot trust a company who is constantly changing prices. This could harm market share in the long-term.— Consumers encouraged to spend time finding ways around the dynamic pricing.— Cost to the firm of monitoring and evaluating data.

APPENDIX B

Benefits of Accessibility^{lxxxi}



APPENDIX C

Framework for Measuring the Benefits of Accessibility^{lxxxii}

Class of benefit	Type of benefit	Beneficiary	Description	Quantification	Monetization - indexing
<i>Use</i>	Mobility	People with disabilities	Wider access to desired destinations, generated trips.	Demand analysis; Geographic information systems; Gravity and Isochronic indices	Willingness to pay/accept;
<i>Use</i>	Mobility	People with disabilities	Time savings	Demand analysis	Value of time
<i>Use</i>	Mobility	People with disabilities	Improved health outcomes	Quality-adjusted life years	Value of quality-adjusted life years.
<i>Use</i>	Mobility	People with disabilities	Net new employment	Labour market analysis and multiplier effects	Personal income (productivity); tax revenue
<i>Use</i>	Quality of Time Spent	People with disabilities	Increased comfort	Demand analysis	Willingness to pay premiums
<i>Use</i>	Quality of Time Spent	People with disabilities	Increased convenience	Demand analysis	Willingness to pay premiums
<i>Use</i>	Quality of Time Spent	People with disabilities	Reduced stigmatic harms	Cost monetization or demand analysis	Willingness to pay/accept premiums
<i>Use</i>	Safety	People with disabilities	Reduced fatalities, injuries, property damage	Demand and incidence analysis	Willingness-to-pay based statistical value of life, limb, suffering, property
<i>Use</i>	Mobility	People without disabilities	Wider access to desired destinations, generated trips.	Demand analysis; Geographic information systems; Gravity and Isochronic indices	Willingness to pay/accept; value of quality-adjusted life years.
<i>Use</i>	Mobility	People without disabilities	Time savings	Demand analysis	Value of time
<i>Use</i>	Mobility	People without disabilities	Increased comfort	Demand analysis	Willingness to pay premiums
<i>Use</i>	Mobility	People without disabilities	Increased convenience	Demand analysis	Willingness to pay premiums
<i>Use</i>	Safety	People without disabilities	Reduced fatalities, injuries, property damage	Demand and incidence analysis	Statistical value of life, limb, suffering, property
<i>Use</i>	Macro-economic Impacts	Society-at-large	Income gains through higher labour market participation and educational attainment	Input-output analysis	Direct, indirect and induced GDP
<i>Non-Use</i>	Cross-Sector	Society at-large	Social service agency resources	Demand and budget analysis	Budgetary resource savings
<i>Non-Use</i>	Option Value	Society at large	Insurance	Demographic analysis; stated preference analysis	Willingness to pay/contingent valuation analysis
<i>Non-Use</i>	Existence Value	Society at-large	Civic society	Stated preference	Contingent valuation
<i>Capability</i>		People with disabilities	Access to freedoms through due process; political process; judicial process	Periodic randomized sample survey	Index of participation in daily life
<i>Capability</i>		People with disabilities	Increased life-opportunities through access to health, employment, education, social outlets ...	Periodic randomized sample survey	Index of health, education, and wellness
<i>Capability</i>		People with disabilities	Increased subjective well-being	Periodic randomized survey	Index of subjective well-being

APPENDIX D

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