Department for Transport

Future of transport regulatory review consultation:

Maritime autonomy and remote operations

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This publication is also available on our website at www.gov.uk/government/organisations/department-for-transport

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Introduction

We want the UK to be a world leader in shaping the future of transport. A flexible and forward-looking regulatory framework for transport is critical to achieving this.

The Future of Transport regulatory review aims to address areas of transport regulation that are outdated, a barrier to innovation, or not designed with new technologies and business models in mind.

This consultation is the third opportunity for us to gather your views on the regulatory review, following the publication of the:

- Future of Mobility: Urban Strategy in March 2019
- Future of Transport regulatory review: call for evidence on micromobility vehicles, flexible bus services and Mobility-as-a-Service, which ran between 16 March and 3 July 2020. A summary of responses was published in November 2020

This consultation aims to build on our 2019 and 2020 work. It seeks views and evidence from all those with an interest in what an innovative and flexible regulatory framework looks like for emerging transport technologies and puts forward specific proposals.

As part of the review, we're also consulting on:

- zero emission vehicles
- future of flight
- regulatory sandboxes
- modernising vehicle standards

You're welcome to provide feedback on as many topics as are relevant to your areas of interest and expertise.

Background and proposal

As the development of autonomous and remote operations technology continues alongside its introduction into the marine environment, there is a need to ensure that UK law keeps pace to ensure the safe, secure, and environmentally sound operation of remotely operated[footnote 1] and autonomous vessels[footnote 2].

For the purposes of this consultation, we will refer to these types of vessels as MASS (Maritime Autonomous Surface Ships), which is defined in Definitions and responsibilities.
This consultation builds on the findings of The Maritime Autonomy Regulation Lab Report (MARLab) (2019).

This report highlighted a number of issues and areas for clarification in the Merchant Shipping Act 1995 (MSA 1995) that ought to be addressed to facilitate and enable the operation of these vessel types.

For example, the need for the clarification of terms like ‘Master’, updating obligations such as the onboard carriage of documentation and addressing gaps such as the requirements for Remote Operation Centres (ROCs), which is defined in Definitions and responsibilities.

We believe that government intervention is required in the form of a comprehensive regulatory framework that will support existing manufacturers and operators in the continued development and operation of MASS in the UK and ensure that their evolving nature is adequately facilitated in UK legislation.

This proposal will also prepare our domestic legal framework for future changes in international law and ensure that the UK is at the forefront of any developments in the field.

Our proposal includes 4 main elements:

1. To identify and determine key definitions and roles for the operation of remotely operated and autonomous vessels.

Our aim is to allow flexibility to develop appropriate definitions, or allow for the amendment of existing ones, in secondary legislation as the MASS industry and international law evolve. However, some key terms may need to be contained in primary legislation.

We propose that there should be an entity that, or person who, is accountable and responsible for a remotely operated or autonomous vessel at all times, including in the event of an emergency or accident.

Further details of such requirements would be developed in secondary legislation, in consultation with industry and operators.

2. Ensuring that the Maritime Coastguard Agency (MCA) can regulate MASS of any size, including craft that might not traditionally be considered as ‘ships’. The MCA has already been approached regarding MASS as small as sub-1 metre.

3. To grant the MCA new powers to develop regulations for ROCs to ensure the safe operation and management of remotely operated or autonomous vessels.

The regulation of ROCs is not straightforward under the MSA 1995. The legislative changes proposed in this consultation would provide the MCA with powers, including those necessary to ensure safe manning principles can be applied to vessels that are operated remotely or are autonomous.

4. Ensuring that the MCA and DfT and ports and harbours have sufficient powers to regulate health and safety, security and the environmental aspects of MASS and ROCs.

Definitions and responsibilities

We are proposing to define and clarify terms and roles for the operation of remotely operated and autonomous vessels in primary and secondary legislation. This includes a definition of these vessel types and a requirement for these vessels to have an entity or person who is accountable for their operation.

Remotely operated and autonomous vessels

A variety of terms are used across industry to describe remotely operated and autonomous vessels.

Having considered terms used by industry, other countries and developments at the International Maritime Organization (IMO) we are proposing to use the terms Maritime Autonomous Surface Ships (MASS) and remote operations as follows:

MASS includes every description of vessel or craft used in navigation that can for any part of its voyage, fully or in part navigate or operate autonomously or through remote operations

remote operations means controlling the functioning of an operation on a MASS from a different place or location from that MASS

We propose that the definition of MASS would apply to all vessels and craft regardless of size, including very small craft that might not be considered ships since they are not within the scope of the MSA 1995.

Any potential primary legislation will not provide definitions for degrees or types of autonomy.

However, for clarity, the following would be included within the scope of the legislation:

remotely operated vessels or craft that have no persons on board

remotely operated vessels or craft that may have persons on board (for example, crew, personnel and/or passengers)

vessels or craft operating fully autonomously (currently no distinction as to whether persons are on board or not)

Master

In current legislation, the master performs a key role and holds significant responsibilities with regards to the vessel they are onboard, having overall responsibility for the vessel, crew, cargo, passengers and regulatory compliance.

With the growth and adoption of remotely operated and autonomous vessels, we propose that a similar arrangement is mirrored in the new legislation for the person having command of a MASS.

We are proposing the following definition of a ‘MASS master’, who is not required to be onboard the MASS:

- MASS master includes a person (except a pilot) having command or charge of a MASS

The proposed definition is based on the following principles:

1. A master does not need to be onboard a MASS.
2. The definition of a master should focus on their roles and responsibilities, removing any reference to their physical location in relation to a vessel, or the characteristics of the vessel (for example, manned or unmanned). The legislation should ensure that all responsibilities are enforceable against a master not on board a vessel.
3. The definition must not change the need for the master to be onboard a non-MASS vessel.

Remote operator

Current powers allow the MCA to ensure vessels are safely manned and we need to ensure this is applicable to MASS as well. MASS may be manned remotely with vessels being operated by person called a Remote Operator. We are proposing the following definition for a Remote Operator:

- Remote Operator includes every person, including a MASS master, who is employed or engaged in any capacity to undertake remote operations of a MASS

The principles and details of certification and training requirements for a Remote Operator including hours of rest for watchkeeping, would be developed in secondary legislation.

Remote Operations Centre

A Remote Operator will operate a MASS from a different place or location from where the vessel is operating. Additional powers are needed to ensure safe manning considerations can be applied to MASS, including from the Remote Operation Centre (ROC) from which these vessels are remotely operated. For the purposes of this consultation, we define the ROC as follows:

- ROC is a place or location from where at least one Remote Operator is operating a MASS

The details of the requirements for ROCs would be developed in secondary legislation.

In the meantime, we welcome feedback on the foregoing considerations for ROCs. These do not all form part of our proposal for legislative change but may be used to formulate future policy.

Proposed legislative change

We are proposing to amend the current legal framework to take powers in primary legislation to regulate all MASS regardless of size, including craft that would not traditionally be considered ships.

The benefits of this approach would be to:

- give the UK the powers to ensure the new and growing sector of MASS is appropriately regulated and supported
- ensure there is a cohesive approach to maritime operations and regulatory oversight as between MASS and non-MASS
- ensure that all vessels in the UK fleet and operating in UK waters are built, surveyed, operated and inspected to ensure they do not cause harm to other maritime users, the environment, human health, property or resources
- allow the UK to provide an active and informed position in international discussions that will shape the regulation of MASS internationally and the development of an IMO instrument
- prepare the UK domestic law framework for future changes in international law

There is a risk that in developing the domestic legal framework now the UK could diverge from international standards as they are agreed in the future, for example, when defining terms and definitions of MASS.

However, the UK will be able to take its experience on the regulation of MASS to the international discussions to shape the debate and therefore to minimise this risk.

We may need to provide MCA with powers to define and clarify terms and roles for the operation of MASS, in addition to those defined in the primary legislation, as set out above.

This would allow flexibility to develop appropriate definitions in secondary legislation as the MASS industry evolves.

There is no current consensus on what these terms and roles should be, but these powers should provide the flexibility to change the definitions as experience of MASS develops and the international legal framework evolves.

To ensure parity across the industry and guarantee the safety, security and protection of the marine environment, we are seeking to ensure that the MCA has the powers to apply and perform its current statutory responsibilities (survey, inspection, certification, and enforcement) on UK-flagged MASS, and MASS operations in UK waters and their associated ROCs.

Other options

Do minimum (baseline option)

In the absence of any new legislation, the MCA would continue to utilise the exemption that is available through The Merchant Shipping (Load Line) Regulations 1998, to allow autonomous shipping to continue to operate within UK waters and under the UK Flag.

MASS would continue to be obliged to comply with all other applicable Regulations. The Workboat Code would be updated for remotely operated surface vessels under 24 metres in length.

However, their regulation would be limited to the current powers of the MSA 1995 and related primary legislation.

The benefits of retaining the existing process are that:

- industry are aware of the requirements
- the MCA can continue to use a safety-case approach to ensure these vessels are thoroughly assessed to support their safe operation within UK waters
- there is no need to amend primary legislation

There are a number of risks involved in continuing with the current approach:

- reputationally, there is a perception that the industry is being held back by existing legislation and we are not doing enough to support emerging technologies
- the Load Line Exemption Certificate was not originally designed for the regulation of MASS and it would be preferable to have a bespoke regime for this
- gaps in powers (for example, around training and ROCs) would remain, which could limit the safe operation of these vessels
- exemptions and equivalences may not be available or suitable as industry develops larger and more complex MASS which could limit MASS in UK waters
- the UK domestic legal framework would not be ready for future changes in international law

In addition, there is reputational risk, where in the absence of UK legislation on MASS, the UK may lose its standing as a leader in maritime autonomy.

This could also potentially reduce the UK's effectiveness to direct the development of new instruments based on the practical implementation of the safety requirements of MASS as part of discussions at the IMO.

Wait for the IMO to produce new regulation for MASS

This option is the same as the 'do minimum' option until new regulation of MASS is agreed at the IMO.

The most recent discussion at IMO indicated that, following a regulatory scoping exercise, further work is needed to identify how to regulate the safe running of autonomous and remotely operated vessels internationally.[footnote 3]

Based on current workloads, the Maritime Safety Committee (MSC) of the IMO has indicated that a new instrument could be developed, but not before 2028.

The benefits of this option are that:

- it would guarantee consistency between the domestic and international regulatory framework for the safe operation of MASS
- industry are aware of the current process to get a MASS on the water in the UK
- the MCA can continue to use a safety-case approach to ensure these vessels are thoroughly assessed to support their safe operation within UK waters

The risks with this approach are the same as for the baseline option.

A more detailed breakdown of the costs, benefits and risks for each option is set out in the Impact Assessment on Maritime Autonomy and Remote Operations.

Ports and harbours

Ports are regulated by the devolved administrations and we will work closely with them in developing any legislative changes.

In England, ports are generally controlled by harbour authorities, which are statutory bodies created either by local Acts of Parliament or by a harbour empowerment order under section 16 of the Harbours Act 1964 (‘the 1964 Act’).

The power of harbour authorities is contained in their enabling acts or orders, supplemented in various cases by harbour revision orders under the 1964 Act. Certain legislative changes may be necessary to the legal framework governing ports and harbours to support our preferred approach to regulating MASS as previously set out.

As with other legislation, including the MSA 1995, these legislative changes would enable us to ensure that definitions in harbours legislation (both general and local Acts) are broad enough to cover MASS, for example, the definitions of ‘ship’ and ‘master’.

In addition, we propose that the legislative change contains a power similar to that in section 60 of the 1964 Act to allow the Secretary of State for Transport to repeal or amend any provision relating to a harbour which is contained in an existing local act or order, where that provision appears inconsistent with, or has become unnecessary in consequence of any provision in the legislative changes proposed here.

The aim of this would be to address the complexity of local harbours legislation while reflecting the fact that local harbour authorities are best placed to understand the legislation that governs their own harbour.

As with section 60 of the 1964 Act, we propose that this power would be subject to safeguards including that the Secretary of State for Transport would not exercise the power save on application of a harbour authority and would only do so following consultation.

Otherwise, we do not consider that new powers in harbours legislation are required to enable harbours to regulate MASS operations within their jurisdictions.

Autonomous and unmanned submersible apparatus

The use of autonomous and remotely operated systems extends below the surface of the seas where underwater apparatus have been operating by autonomous means for decades.

These operations have been focused primarily in the realms of defence and marine research and there has been limited impact by these apparatus on wider maritime users.

The increased interest in autonomy in the maritime, automotive and aeronautical arenas has renewed considerations of what is feasible within the underwater space. There will potentially be wider and more varied use of autonomous underwater apparatus in the future.

Therefore, to ensure the continued safe regulation of the maritime space and a consistent approach to the use of autonomous and remotely operated systems, we propose to introduce powers to regulate autonomous and unmanned submersible apparatus in a manner consistent with manned submersible apparatus to be exercised at a future date through secondary legislation when these concepts mature.

Marine equipment

Equipment fitted to a vessel plays an essential part in ensuring its overall safe operation and the protection of the marine environment and is regulated through the Merchant Shipping (Marine Equipment) Regulations 2016 (‘the 2016 Regulations’).

The overall system for type approval of marine equipment is believed to be appropriate for MASS and ROCs and we propose to apply it to them.

We will ensure that the MCA has the necessary powers to regulate equipment fitted to MASS and ROCs relevant to safety, security and pollution prevention.

It is acknowledged that the equipment which is currently covered by the 2016 Regulations, and the standards that are applied, may need to be amended to include new types of equipment.

In particular, the regulation and type approval of software systems and algorithms may need to be considered independently of the (variety of) hardware they may ultimately be used with.

Security

Maritime security is a broad term encompassing the protection of vessels from both physical and non-physical threats. This ranges from protection against terrorism, piracy and robbery, to cyber-crime and violations of intellectual property.

Maritime security is currently governed by a range of different legislative instruments including:

- international conventions such as SOLAS (Safety of Life at Sea) and the Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation (SUA Convention)
- primary legislation such as the Aviation and Maritime Security Act 1990 (AMSA 1990) and secondary legislation, including the Port Security Regulations 2009

Changes may be necessary to the legislative framework governing maritime security to support our preferred approach to regulating MASS for a number of reasons:

1. To resolve definitional issues such as ‘ship’ and ‘master’, which appear in the ASMA 1990, in a similar way to the definitional issues with the MSA 1995, which were explored earlier in the chapter.
2. To ensure the offences in Part 2 of the AMSA 1990 against the safety of ships and fixed platforms are appropriately applied to MASS and ROCs. For example, we wish to ensure that it is an offence to seize control of an unmanned ship through remote operation even where the ship then does not present a danger to navigation.
3. To ensure Part 3 of the AMSA 1990 (which contains provisions giving the Secretary of State for Transport powers to issue directions to harbour owners and ship owners for the purpose of protecting ships, persons, property and harbour areas ‘against acts violence’) also extends to cover ROCs.
4. To ensure we have the power to implement international requirements for maritime security on MASS or ROCs.
5. To ensure we have the powers to set standards for security and cyber security for MASS and ROCs.

Insurance and liability

Existing international conventions developed under the auspices of the IMO govern liability, compensation and compulsory insurance requirements for most shipowners.

These conventions cover examples such as:

- oil pollution damage caused by ships
- damage suffered by passengers on seagoing ships (including death and personal injury claims)
- wreck removal

Specific provision is also made to uphold a shipowner's right to limit their liability. At present, for insurance purposes, the 13 Protection & Indemnity (P&I) Clubs which comprise the International Group (IGP&I Clubs) between them provide marine liability cover for about 90% of the world's ocean-going tonnage.

Any future regulatory changes to the international conventions will need to be worked up and adopted by the IMO.

The Legal Committee (LEG) of IMO has recently completed a gap analysis in relation to liability and compensation for MASS operations under these IMO instruments.

In anticipation of these changes, and to lay down the foundations for future safe and environmentally and economically viable MASS operations, our domestic legal framework may need amending.

New insurance policies will also need to be developed by industry to meet the liability insurance needs of owners and operators of autonomous and remotely operated vessels.

Designated test areas for MASS

We do not propose designating test areas for MASS trials. As long as appropriate certification through the current exemption processes can be obtained there are methods by which MASS can be trialled in all UK waters.

Allowing the trialling of MASS across the UK provides a wide variety of environments for them to be tested, and in real-life scenarios.

We consider that the powers proposed for these legislative changes would render designated test areas unnecessary because the powers would create a regulatory framework for the development of safe, secure and environmentally sound MASS.

Other MASS issues

The following areas will not require amendment to allow the operation of MASS in UK waters. These are:

- Search and Rescue (SAR) obligations on vessels
- wreck and salvage requirements
- Port State Control within domestic legislation

How to respond

The consultation period began on 28 September 2021 and will run until 11:45pm on 22 November 2021. Ensure that your response reaches us before the closing date.

Further copies and alternative copies of this consultation document, such as Braille and audio CD, for example, can be requested at FutureOfTransport@dft.gov.uk.

You may send your consultation response:

- via the online survey
- by downloading the response form and emailing us the return at FutureOfTransport@dft.gov.uk
- by emailing FutureOfTransport@dft.gov.uk directly with your comments
- by post at:

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When responding by email only, state whether you are responding as an individual or representing the views of an organisation. If responding on behalf of a larger organisation, make it clear who the organisation represents and, where applicable, how the views of members were assembled.

If you have any suggestions of others who may wish to be involved in this process, contact us.

Questions

This is a list of questions that appear in the consultation and is for information purposes only. If you wish to reply to the questions, see How to respond.

Definition of MASS

In your view, is our proposed definition of MASS appropriate? If not, please explain why and what alternative would you propose?

Definition of Remote Operations

In your view, is our proposed definition of Remote Operations appropriate? If not, please explain why and what alternative you would propose?

Definition coverage

Is there any type of autonomous or remotely operated vessel that our definition would not cover? If so, please explain.

Craft types

In your opinion is it acceptable to apply this legislation to vessels and craft regardless of size, including those that currently fall outside the scope of The Merchant Shipping Act 1995? If not, please explain your reasoning.

Definition of MASS master

In your view should any of the responsibilities of a master be modified for a ‘MASS master’?

Definition of Remote Operator

In your view does our proposed definition of ‘Remote Operator’ cover the full range of remote manning roles for a MASS? If not, can you propose an alternative definition?

Remote Operation Centres and Remote Operator

Do you have any views on the following propositions?

- the ROC should be located within the territory of the Flag State Administration
- the ROC should be considered an integral part of a MASS (as an alternative version of the bridge of a vessel)
- the ROC should be safely manned in the same way safe manning is applied to conventional vessels
- Remote Operators should not be considered seafarers as they are not on board the ship they are operating but they will require agreed training and certification.

Proposed legislative change

In your view is our proposal to take powers to regulate all MASS the best option for the UK maritime sector? If not, what alternative do you suggest?

In your view should we create powers to:

- define terms and roles for the operation of MASS
- regulate ROCs to ensure the safe operation of MASS in UK waters?

Maritime Autonomy and Remote Operations Impact Assessment

Do you have any comments on the accompanying Maritime Autonomy and Remote Operations Impact Assessment?

Ports and harbours

In your view, do harbour authorities and ports already have sufficient powers or do they need any additional powers in relation to MASS?

Autonomous and unmanned submersible apparatus

In your view, should we create powers to regulate autonomous submersible apparatus in a manner consistent with manned submersible apparatus? Should we create powers to regulate unmanned submersible apparatus in a manner consistent with manned submersible apparatus? If answering no, please explain why.

Marine equipment

In your view, if they are extended to include ROCs, are existing type approval mechanisms sufficient to assess equipment located in or associated with ROCs? If you answered no, what alternatives do you suggest?

Is the existing type approval approach suitable for approving software programs or algorithms independently of hardware? If you answered no, what alternatives do you suggest?

Maritime security

In your view, are there any additional changes to primary legislation, beyond those mentioned, which are required to maritime security legislation to support our proposed approach to regulating MASS?

Insurance and liability

In your view are there any challenges the insurance industry would face to implement our proposed approach? If yes, please explain these challenges.

Designated test areas for MASS

What views do you have on our proposal not to designate test areas, to support the development of MASS in UK waters?

In your view, are there any additional aspects of primary legislation (acts of Parliament) you think need to be considered in relation to MASS? If yes, please explain your response.

Are there any environmental impacts from MASS that may not exist with conventional shipping?

In your view, is there anything that government can do to promote any environmental benefits or limit any environmental impacts from MASS, as distinct from conventional shipping?

We also invite you to look at the additional 10 questions in the Maritime Autonomy and Remote Operations Impact Assessment.

Do you have data or evidence about whether any of the proposals would positively or negatively impact individuals with protected characteristics (as defined in section 4 of the Equality Act 2010)?

We also invite you to look at the additional 10 questions in the Maritime Autonomy Impact Assessment.

Public Sector Equality Duty

Do you have data or evidence about whether any of the proposals would positively or negatively impact individuals with protected characteristics (as defined in section 4 of the Equality Act 2010)?

Final comments

Are there any final comments you would like to make?

Next steps

These responses will complement evidence gathered from the Future of transport regulatory review: call for evidence and other work on the Future of Transport to inform our work on this regulatory review. A government response will be published in due course.

In the call for evidence, we said that ultimately the regulatory review may conclude that substantive legislative reform is required. We will continue to engage with stakeholders as our plans develop and as we determine areas where changes to primary legislation are necessary. Where that is the case, we would look to bring forward legislative proposals when Parliamentary time allows.

Footnotes

1. Remotely operated vessels, for the purposes of this consultation, refer to vessels where there is a human element involved in the control or operation of the vessel, but that human element is not located onboard the vessel; or to a vessel that carries crew but some functions of the vessel are controlled from a location remote from the vessel.
2. Autonomous vessels, for the purposes of this consultation, refers to vessels that are capable of decision-making and operating without human input.
3. MSC1.1638 outcome of the regulatory scoping exercise for the use of Maritime Autonomous Surface Ships (MASS) (3 June 2021)

Consultation principles

The consultation is being conducted in line with the Government's key consultation principles which are listed below. Further information is available at https://www.gov.uk/government/publications/consultation-principles-guidance

If you have any comments about the consultation process please contact:

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