

# CMI QUESTIONNAIRE ON UNMANNED SHIPS

Response by Maritime Law Association of South Africa

## INTRODUCTION

*Unmanned ships are those which are capable of controlled movement on the water in the absence of any onboard crew. Control is performed in essentially two ways. It can be performed by remote-control, whereby a shore-based remote controller uses a computer and joystick to control the unmanned ship's movement and signalling using radio and satellite communications. In doing so the controller is aided by the streaming of the ship's vicinity effected by cameras and aural sensors affixed to the ship's hull / chassis. There is a small delay in the transmission of information to and from the ship, like with all forms of satellite communication. On the other hand, the ship may be "controlled" autonomously. This involves the ship being pre-programmed before deployment, and, thereafter, performs a predetermined nautical course without any human interaction. This control, as well as a degree of collision avoidance capability, is affected with the use of highly sophisticated software technology, control algorithms and sonar radar.*

*Whereas unmanned ships in operation today are small in size (<20m in length) and essentially used for marine scientific research and military purposes their number has risen exponentially in recent years and so has the number of research projects aimed at developing the first unmanned merchant ships of 500 grt or more.*

*In order to ensure that the required regulations are in place once these ships become a technical reality, CMI Executive Council has set up an International Working Group (IWG) to study the current international legal framework and consider what amendments and/or adaptations and/or clarifications may be required in relation to unmanned ships.*

*In answering the questions below please assume that they are made in relation to an unmanned ship of 500 grt or more.*

1. NATIONAL LAW
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- 1.1. Would a “cargo ship” in excess of 500 grt, without a master or crew onboard , which is either
- 1.1.1. controlled remotely by radio communication?
  - 1.1.2. controlled autonomously by, inter alia, a computerised collision avoidance system, without any human supervision
- constitute a “ship” under your national merchant shipping law?

*Answer:*

As a point of departure, the Merchant Shipping Act 57 of 1951 (“MSA”) defines a “ship” as follows:

*“ship” means any kind of vessel used in navigation by water, however propelled or moved, and includes—*

- (a) a barge, lighter or other floating vessel;*
- (b) a structure that is able to float or be floated and is able to move or be moved as an entity from one place to another; and*
- (c) a dynamically supported craft;*

This definition is not dependant on the way that the ship is controlled. Therefore a remotely controlled or autonomously controlled ship is not necessarily precluded from this definition.

- 1.2. Would an unmanned “ship” face difficulty under your national law in registering as such on account of its unmanned orientation?

*Answer:*

Section 16 of the Ship Registration Act 58 of 1998 (“SRA”) sets out the classes of ships that are entitled to registration:

*Section 16: Ships entitled to be registered.-*

*Subject to this Chapter, the following ships are entitled to be registered:*

- (a) South African-owned ships;*
- (b) small vessels, other than fishing vessels, that are*

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- (i) wholly owned by South African residents or South African residents and South African nationals; or*
- (ii) operated solely by South African residents or South African nationals or both such residents and such nationals; and*
- (c) ships on bareboat charter to South African nationals.*

Once again, there is no mention of the means by which the ship is controlled and an unmanned ship that is wholly owned by South African residents could potentially be registered in terms of this Act. However, cognisance should be given to the fact that the legislature did not contemplate the concept of an unmanned ship when drafting this Act, and we should be cautious in extending the application of its provisions.

1.3. Under your national law, is there a mechanism through which, e.g. a Government Secretary may declare a “structure” to be a “ship” when otherwise it would not constitute such under the ordinary rules?

*Answer:*

In terms of Section 53(3) of the SRA, the Minister of Transport may make Regulations to the Act:

*(3) The regulations may*

*(a) make different provision for different classes or descriptions of ships and for different circumstances;*

*(b) without prejudice to the generality of paragraph (a), make provision for the granting of exemptions or dispensations by the Authority from specified requirements of the regulations, subject to any condition that it may deem fit to impose;*

*(c) make provision for the registration of any class or description of ships to be such as to exclude the application of Schedule 1 and may regulate the transfer, transmission or mortgaging of ships of the class or description so excluded;*

*(d) prohibit the registration of any class or description of ships;*

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*(e) make the incidental or supplementary provisions that appear to the Minister to be necessary or expedient, including provisions authorising investigations and conferring powers of inspection.*

The Minister of Transport accordingly has the authority to grant an exemption to, or make additional provisions for, an unmanned ship that does not necessarily comply with the prescribed registration requirements.

1.4. Under your national merchant shipping law, could either of the following constitute the unmanned ship's "master"

1.4.1. The chief on-shore remote-controller

1.4.2. The chief pre-programmer of an autonomous ship

1.4.3. Another 'designated' person who is responsible on paper, but is not immediately involved with the operation of the ship

*Answer:*

The MRA defines a "master" as:

*"master" means, in relation to a ship, any person (other than a pilot) having charge or command of such ship.*

The SRA defines a "master" as:

*"master" means the person having lawful command or charge, or for the time being in charge, of a ship, but does not include a pilot aboard a ship solely for the purpose of providing navigational assistance.*

According to the general rules of the interpretation of statutes in South Africa, the words "charge" and "command" ought to be given their ordinary meaning. Consequently, a person who is not on board a ship cannot be deemed to be in command or charge of such ship.

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It is worth noting there are specific Regulations to the MRA that deal with the obligations and requisite qualifications of the master. Regulations 2 and 91 of the Merchant Shipping (Safe Manning, Training and Certification) Regulations 2013 respectively set out the required certificates and duties of masters. Such duties include *inter alia* the monitoring of on board safety, collision regulations and radio regulations which can arguably only be performed by a master who is on board the ship. Furthermore, a chief on-shore remote controller, chief pre-programmer or other designated person responsible for the ship would not be authorised to act as the master of a ship unless they possess the minimum certification in accordance with Regulation 2.

1.5. Could other remote-controllers constitute the “crew” for the purposes of your national merchant shipping laws?

*Answer:*

The MRA defines “crew” as:

*“crew” means all seamen on board a ship.*

A remote-controller who is not physically on board the ship would therefore not qualify as a member of the crew in terms of this definition.

1.6. Under your national merchant shipping law, could either of the following constitute the unmanned ship’s “master”

1.6.1. The chief on-shore remote-controller

1.6.2. The chief pre-programmer of an autonomous ship

1.6.3. Another 'designated' person who is responsible on paper, but is not immediately involved with the operation of the ship

*Answer:*

See clause 1.4 above.

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1.7. Could other remote-controllers constitute the “crew” for the purposes of your national merchant shipping laws?
<i>Answer:</i>  See clause 1.5 above.
2. UNITED NATIONS CONVENTION ON THE LAW OF THE SEA, 1982 (UNCLOS)
2.1. Do you foresee any problems in treating unmanned ships as “vessels” or “ships” under the Law of the Sea in your jurisdiction (i.e. that such ships would be subject to the same rights and duties such as freedom of navigation, rights of passage, rights of coastal and port states to intervene and duties of flag states) in the same way as corresponding manned ships are treated?
<i>Answer:</i>  This situation was not contemplated in UNCLOS and there is currently no distinction between manned and unmanned ships or vessels in terms of South African law.
2.2. Paragraphs (3) and (4) of UNCLOS Article 94 include a number of obligations on flag states with respect to the manning of such ships. Do you think that it is possible to resolve potential inconsistencies between these provisions and the operation of unmanned ships without a crew on board through measures at IMO (under paragraph (5) of the same Article) or do you think other measures are necessary to ensure consistency with UNCLOS. If so, what measures?
<i>Answer:</i>

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Either the manning obligations in UNCLOS would have to be changed or South Africa would have to amend its ratification of UNCLOS to excise any reference to manning and then deal with unmanned ships in domestic legislation.

### 3. IMO CONVENTIONS – THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA (SOLAS) 1974 (AS AMENDED)

3.1. Does your national law implementing the safe manning requirement in Regulation 14 of Chapter V of SOLAS require at least a small number of on board personnel or does the relevant authority have the discretion to allow unmanned operation if satisfied as to its safety?

*Answer:*

Regulation 95 and Part 6 of the Merchant Shipping (Safe Manning, Training and Certification) Regulations 2013 regulates the minimum number of persons employed on South African ships. However Regulation 95(4) provides some flexibility in this regard:

*(4) The owner and/or master may apply to the Proper Officer at the nearest port for the number of certified officers and ratings to be determined in accordance with this subregulation. The Proper Officer may only issue such an alternative manning after:*

*(a) The owner has applied in writing motivating the deviation from the manning levels provided in Part 6, and has provided a risk assessment. Should the application be for multiple vessels, such vessels shall be similar in size and operations; and*

*(b) the Proper Officer, if in agreement with the application in sub-paragraph (a) shall-*

*(i) appoint a surveyor to review the risk assessment and make recommendations to him; and*

*(ii) if satisfied, issue a safe manning document with such alternative manning levels established in accordance with the risk assessment and recommendations of a surveyor.*

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It would appear that, subject to the discretion of the Proper Officer and a risk assessment by an appointed surveyor, a deviation from the regulations contained in Part 6 may be allowed. However, the extent of the deviation would depend on the risk assessment of the surveyor. It is unlikely that an unmanned ship would pass such assessment.

3.2. Regulation 15 of SOLAS Chapter V concerns principles relating to bridge design. It requires decisions on bridge design to be taken with the aim of, inter alia, “facilitating the tasks to be performed by the bridge team and the pilot in making full appraisal of the situation...”. In the context of a remote controlled unmanned ship, could this requirement be satisfied by an equivalent shore-based facility with a visual and aural stream of the ship’s vicinity?

*Answer:*

As with most legislation dealing with the manning, crewing and operation of a ship, it was not contemplated that unmanned ships would exist. Although certain definitions, simply by their silence, would include unmanned ships, our view is that an attempt to rely on such definitions and the obligations that flow from manning and crewing etc, without an extensive overhaul of legislation to deal specifically with unmanned ships would be unwise.

3.3. As interpreted under national law, could an unmanned ship, failing to proceed with all speed to the assistance of persons in distress at sea as required by Regulation 33 of SOLAS Chapter V, successfully invoke the lack of an on-board crew as the reason for omitting to do so (provided that the ship undertook other measures such as relaying distress signals etc.)?

*Answer:*

The regulation provides that the Master of a ship which is in a position to be able to provide assistance shall do so. If the ship is unable or under the special circumstances of the case considers it unreasonable or unnecessary to assist, the Master must enter into the logbook the reason for failing to proceed to the assistance

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of the persons in distress. If, as a result of being unmanned, the ship is unable to provide assistance or the controllers consider it unreasonable or unnecessary then they are not obliged to do so. Whether this was in fact the case would depend on the circumstances. Certain casualties could receive valuable assistance from an unmanned ship, but others could not.

### 4. THE INTERNATIONAL REGULATIONS FOR PREVENTING OF COLLISIONS AT SEA, 1972 (COLREGS)

4.1. Would the operation of an unmanned “ship” without any on board personnel, per se, be contrary to the duty / principle of “good seamanship” under the COLREGS, as interpreted nationally, regardless of the safety credentials of the remote control system?

*Answer:*

As the technology develops and as the operation of unmanned ships extends beyond short sea voyages between designated places, it may well be that the mere fact that there are no personnel on board can still be viewed as being “good seamanship”. As the technology apparently stands, this would not be the case. The South African courts, like many common law jurisdictions, tend to follow English principles in relation to the definition of terms such as “good seamanship”. Whether a practice constitutes good seamanship is tested by reference to the reasonable behaviour of a prudent shipowner.

4.2. Would the *autonomous* operation of a “ship”, without any on-board personnel or any human supervision, be contrary to the duty / principle of “good seamanship”, under the COLREGS, as interpreted nationally, regardless of the safety credentials of the autonomous control system?

*Answer:*

See clause 4.1 above.

4.3. As interpreted under national law, could the COLREG Rule 5 requirement to maintain a “proper lookout” be satisfied by camera and aural censoring

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<p>equipment fixed to the ship transmitting the ship's vicinity to those "navigating" the ship from the shore?</p>
<p><i>Answer:</i></p> <p>Regulations require every vessel to maintain a proper lookout by sight and hearing, as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and of the risk of collision. It is recognised that this would include not merely having an officer of the watch and/or lookout on the bridge maintaining a watch by sight and hearing. It may require someone to be posted on the bow in heavy fog to receive early warning of visual or aural signals. It would certainly include maintaining a watch by way of radar, possibly by way of AIS and maintaining a listening watch on the appropriate VHF channels. Whether or not a system would comply with this obligation would depend on the sophistication of the system and of the signal strength, rate of transmission and backup transmission channels available to ensure that the shore controller was in as good a position as he/she would be if they were in fact on the ship, properly qualified and maintaining a proper lookout.</p>
<p>4.4. Would a ship navigating without an on-board crew constitute a "vessel not under command" for the purposes of COLREG Rule 3(f), read together with COLREG Rule 18, as interpreted under your national law?</p>
<p><i>Answer:</i></p> <p>An unmanned ship may well constitute a vessel not under command as defined in Regulation 3(f). This however would mean that she would not be approved to sail in that condition constantly. A vessel not under command is a vessel which through some "exceptional circumstances" is unable to manoeuvre. If a vessel is permanently unmanned, this is not an exceptional circumstance, it is a design feature.</p>
<p>5. THE INTERNATIONAL CONVENTION ON STANDARDS OF TRAINING CERTIFICATION AND WATCHKEEPING, 1978 (STCW CONVENTION)</p>
<p>5.1. The STCW Convention purports to apply to "seafarers serving on board seagoing ships". Would it therefore find no application to a remotely controlled unmanned ship?</p>

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*Answer:*

Yes.

5.2. As interpreted under national law, can the STCW requirement that the watchkeeping officers are physically present on the bridge and engine room control room according to Part 4 of Section A-VIII/2 be satisfied where the ship is remotely controlled? Is the situation different with respect to ships with a significantly reduced manning (bearing in mind that the scope of the convention only applies to seafarers on board seagoing ships)?

*Answer:*

The requirement that watchkeeping officers are physically present on the bridge is not satisfied if the vessel is remotely controlled. If there is no one on the bridge, there is no one on the bridge.

### 6. LIABILITY

6.1. Suppose a "ship" was navigating autonomously i.e. through an entirely computerised navigation / collision avoidance system and the system malfunctions and this malfunction is the sole cause of collision damage – broadly, how might liability be apportioned between shipowner and the manufacturers of the autonomous system under your national law?

*Answer:*

In the first instance a claimant whose ship or other property is damaged by an unmanned ship could institute proceedings *in rem* against the ship or *in personam* against her owners or demise charterers. The claimant might, separately, bring their claim in delict/tort against the manufacturers of the autonomous system. Those proceedings would have to be brought against the manufacturers in their country of domicile or, if they own property within South Africa, against the manufacturers in South Africa following an attachment of the manufacturer's property to found and confirm jurisdiction. In order to succeed with a claim against the manufacturer, the claimant would have to discharge the onus of proving on a balance of probabilities that the manufacturer owed them a duty of care, that they had negligently failed to comply with that duty and that failure caused damages to the claimant. Our courts

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are reluctant to enforce claims for pure economic loss, but in principle, there is no reason why a claimant could not proceed against the manufacturer at fault.

Separately, if proceedings were commenced against the ship or her owner, that ship or owner could join the manufacturer as a third party to those proceedings and seek a contribution from them in terms of the South African Apportionment of Damages Act. Our courts would assess the apportionment of liability as between the ship and the manufacturer.

6.2. Arts. 3 and 4 of the 1910 Collision Convention provide for liability in cases of fault. As interpreted under your national law, does the fact that the non-liability situations listed in Art. 2 are not conversely linked to no-fault, leave room for the introduction of a no-fault (i.e. strict) liability (for e.g. unmanned ships) at a national level?

*Answer:*

South Africa is not a party to the 1910 Collision Convention.