

CMI QUESTIONNAIRE ON UNMANNED SHIPS

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 or 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

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: The statutory framework in respect of the Indian vessel is governed by the Merchant of Shipping Act 1958. As per Section 2((55) of the Act:

"vessel" includes any ship, boat, sailing vessel, or other description of vessel used in navigation;

By the virtue of the above definition and various other legal regimes, we could put together that the essential part of defining a vessel is its capability to navigate on the water. The answer to the question, "whether the lack of human crew or no crew on board hinders the

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navigable quality of the vessel”, is unanswered.

The above brief exploration it may be concluded with a considerable degree of certainty that having a crew on board, including a master, is not generally regarded as an essential part of the notion of a ship in the regulatory definitions of the ship available to us.

Therefore, the answer to point 1.1.1 and 1.1.2 is yes, an autonomous ship may find a place within Indian maritime framework.

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

Answer: Part V of the Merchant Shipping Act, 1958 and Registration of ships rules, 1960 as amended from time to time, are concerned with the Registration of Indian ships.

STATUS OF INDIAN SHIPS

The conferment of status of Indian ships is restricted to:

- i) Ships owned by a citizen of India.
- ii) Ships owned by a company or body established by or under any central or state Act which has its principle place of business in India.
- iii) Ships owned by a co-operative society which is registered or deemed to be registered under the Co-operative Society Act, 1912, or any other law relating to Co-operative Societies for the time being in force in any state.

QUALIFICATION REQUIRED FOR REGISTRATION AS INDIAN SHIPS:

Sea going ships fitted with mechanical means of propulsion of 15 tons net and above howsoever employed and those of less than 15 tons net employed otherwise than solely on the coasts of Indian qualify for registration under Part V of the Merchant Shipping Act, 1958. Ships so registerable are required to be registered only at ports designated as ports of registry.

In their capacity as Registrar of ships, the Principal officers and concerned Surveyors In-charge are required to maintain a complete record of ships on register indicating as on a particular date the person/persons, either in their individual capacity or as joint owners or as a corporate body, who have a stake in the ownership of ships. Not more than 10 individuals are entitled to be registered as a owner of a fractional part of a share in a ship, but a maximum of 5 persons could be registered as joint owners of a ship or of any share and shares therein. Joint owners by reason of the position as such cannot, however, dispose off in severalty, any share or interest therein.

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FORMALITIES TO BE OBSERVED FOR REGISTRATION AS INDIAN SHIP :

The owner of a ship wishing to have it registered at a port in India has to submit to the concerned Register:

- a) A declaration of ownership – in one or the other prescribe forms, as may be applicable, depending upon whether he is a sole proprietor, joint owner or a company made before a Registrar, Justice of the peace or an Indian Consular Officer.
- b) A certificate signed by the builder (builder's certificate) of the ship containing a true account of the proper denomination and of the tonnage of the ship as estimated by him and the time, when and the place where the ship was built, (for new ship).
- c) The instrument of sale under which the property of the ship was transferred to the applicant who requires it to be registered in his name, (for secondhand ships). d) To give a minimum of 14 days notice to the Registrar of the name proposed for the ship. The Registrar before registering the vessel in the name of the applicant shall obtain prior approval of the name from the Director General of Shipping who will also allot an official number for the ship.

On being satisfied that the ship, on the strength of the evidence placed before him, is entitled to be Indian ship, the Registrar arranges for survey of the ship by a surveyor for the determination of her tonnage in accordance with the Merchant Shipping (Tonnage Measurement) Rules, 1987 as amended from time to time, for the purpose of issue of a Certificate of Survey.

After the formalities enumerated above have been gone through, the Registrar issues a carving and marking note. This note is to be returned to the Registrar after carving and marking have been duly carried out on the ship in the prescribed manner and certified by a Surveyor. The carving and marking involves the carving of the name of the ship conspicuously on each side of her bows as well as insertion permanently on her stern the name of the intended port of registry.

Please note that: the statutory obligations in respect of manning of Indian vessels emanate from the Merchant Shipping (Amendment) Act, 1987 where in Section 75 and 76 of the principal Act (i.e. Merchant Shipping Act, 1958) have been substituted to conform to the International Convention on "Standards of Training, Certification and Watch keeping" for Seafarers, 1978, signed at London on the 7th Day of July, 1978, as amended time to time.

PART VI

CERTIFICATES OF OFFICERS

2[Masters, mates, engineers, skippers, etc.]

3[75. Application of Part.—*This Part applies to—*

(a) every sea-going Indian ship fitted with mechanical means of propulsion wherever it is; and

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(b) every foreign ship while it is a port or place in India.

75A. Definitions.—*In this Part, unless the context otherwise requires,—*

(a) “contiguous zone” means the contiguous zone of India described, or notified as such for the time being under section 5 of the Territorial Waters, Continental Shelf, Exclusive Economic Zone and other Maritime Zones Act, 1976 (80 of 1976);

(b) “convention” means the International Convention on Standards of Training, Certification and Watch keeping for Seafarers, 1978, signed at London on the 7th day of July, 1978, as amended from time to time;

76. Certificates of competency to be held by officers of ships.—*(1) Every Indian ship, when going to sea from any port or place, shall be provided with officers duly certificated under this Act in accordance with such manning scales as may be prescribed:*

Provided that the Central Government may prescribe different manning scales for different types of ships.

(2) Every ship, whether at sea or in any port or place, shall engage such number of persons and with such qualifications as may be prescribed for maintaining watches.]]

In the light of above discussion:

The manning status or manner of operation of a vessel is not a primary requirement with respect to the qualification to the registration. Section 76 (2) of the M.S. Act 1958, clearly states the safe manning is an important statutory requirement for the certificate of competence under Indian laws (but it's not a statutory requirement while registration of the ship). Thus, the unmanned vessel may find its place in current regime.

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: The Directorate General of Shipping is an attached office of the Ministry of Shipping, Govt. of India and deals with all executive matters, relating to merchant shipping. The Director General of Shipping is vested with statutory powers under Section 7 of the Merchant Shipping Act, 1958. D.G. Shipping acts within the frame work of the legal system. To some extent, the DG Shipping has the power to declare a structure to be a vessel, but in doing so is bound by the ordinary definition of "vessel".

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

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Answer: As per section 3(22) of the MS Act 1958:

“master” includes any person (except a pilot or harbour master) having command or charge of a ship;

However, most of the sections in the MS Act 1958, as regards to the duties of the master, presuppose that the master should be the person on the ship. There are varieties of duty stated in the Act, which are highly unrealistic to perform without being on board. Along with the that by the virtue of the section 29, it is a statutory requirement to state the name of the master for declaration of ownership by the owner. Thus, a master being replaced by the remote control mechanism may not find its place in the current legal regime.

There is no clear answer to the above, although scenario given in 1.4.1 is least problematic of all. To clarify the above necessary amendment has to be made in the MS Act.

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

Answer: As per section 88A(d) of the Act :

(d) “seafarer” means any person who is employed or engaged or works in any capacity on board a sea going ship, but does not include—

(i) the employment or engagement or work on board in any capacity of any person in a ship of war; or

(ii) any Government ship used for military or non-commercial purposes.

The above section clearly states the seafarer as a person working on board a sea going ship. Therefore other remote-controllers onshore cannot constitute the “crew” of Maritime Law. A judicial intervention is necessary as regards this point 1.5.

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: same as above point 1.4

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

Answer: same as above point 1.5

2. UNITED NATIONS CONVENTION ON THE LAW OF THE SEA, 1982 (UNCLOS)

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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?

Answer: India is party to the United Nation Convention on the law of the Sea, 1982 and abides the rules in it. However, the MS Act 1958 presupposes that a master should be on foreign ships. For example, Section 86A states as under:

“86A. Foreign ships not to sail without certificated officers.—(1) Every master of a foreign ship shall, before proceeding to sea from any port or place in India, ensure that the ship has the requisite number of officers and engineers of appropriate grades as specified by the Convention.”

The Indian Port might face technical issues with identifying the relevant autonomous vessel personnel can be made. Along with the same, in the event of default, there are no personnel to arrest may deprive the legal enforcement given in the Indian Admiralty Act. However, unmanned ships in principle would enjoy the same rights and have the same duties as manned ships.

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?

Answer: Article 94 of UNCLOS prescribes several duties to the flag states. Article 94 UNCLOS prescribes obligations on the flag state to ensure that its ships’ crews are “appropriate in qualifications and numbers for the type, size, machinery and equipment of the ship”. If the autonomous vessels are safe, the paragraph 5 of the article 5 of the UNCLOS is wide enough to resolve possible inconsistencies between the provisions in UNCLOS and the operation of the unmanned vessel.

Article 95 (5):

In taking the measures called for in paragraphs 3 and 4 each State is required to conform to generally accepted international regulations, procedures and practices and to take any steps which may be necessary to secure their observance.

There must also be agreement on the technical standards which the programmes must meet, as well as a platform and framework for their continuing regulation and development.

3. IMO CONVENTIONS – THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT

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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?
<p><i>Answer:</i> Regulation 14 of Chapter V of SOLAS prescribes that all States should adopt measures to ensure sufficient and efficient crew and should issue the minimum safe manning document. On the same lines, section 76 of the MS ACT require</p> <p><i>“Every Indian ship, when going to sea from any port or place, shall be provided with officers duly certificated under this Act in accordance with such manning scales as may be prescribed: Provided that the Central Government may prescribe different manning scales for different types of ships. “</i></p> <p>It is also required as per Merchant shipping (safety of navigation) Rules, 1997 and safe manning guidelines issued by the DG shipping that, every Indian ship shall carry on board a safe manning document in the prescribed form specifying the minimum safe manning as provided for the manning scale prescribed in this behalf.</p>
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 contest 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?
<p><i>Answer:</i> Yes, it can be possible, provided that the level of technology developed for the bridge design, shore-based facility and their equipment and security are equivalent to human perception.</p>
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.)?
<p><i>Answer:</i> Regulation V/33 of the International Convention for the Safety of Life at Sea 1974 (SOLAS) imposes an obligation on masters of vessels who are in a position to provide assistance to do so. The lack of an on-board crew can be a reason for not providing assistance of persons in distress at sea because the provision imposes the duty on the “master” of a ship. It is unlikely that autonomous vessels will be held responsible.</p>
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

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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: Good seamen ship depends upon the ability to take action in the adverse conditions.

Provided that the remote control are efficient enough to avert the collision and satisfies the requirement under the COLREGS, they may come under the definition of a good seamanship. As long as their way of operation is equivalent to manned ship, we treat the technology as welcome addition in the practice.

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: Similar to Point 4.1

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 equipment fixed to the ship transmitting the ship’s vicinity to those “navigating” the ship from the shore?

Answer Colreg Rule 5 requires to maintain at all times a proper look-out by: i) sight, by ii) hearing as well as by iii) 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.

Again this depends on the technology development A proper look-out could be satisfied by a camera to have an appropriate sight of the surroundings together with aural censoring to transmit the ship’s vicinity to other vessels and to listen to the sounds. COLREGS was not designed to apply on the unmanned vessel further clarifications are required by the IMO.

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?

Answer: No. The term "vessel not under command" as defined in Rule 3(f) refers to a vessel which through some exceptional circumstance is unable to manoeuvre as required by these Rules and is therefore unable to keep out of the way of another vessel. The "vessel not under command" classification would probably not include a remotely-controlled vessel, which vessel is in fact being commanded, albeit remotely. A ship navigating without an on-board crew does not constitute a “vessel not under command” as far as it is effectively controlled remotely or autonomously.

5. THE INTERNATIONAL CONVENTION ON STANDARDS OF TRAINING CERTIFICATION AND WATCHKEEPING, 1978 (STCW CONVENTION)

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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?

Answer: The STCW Convention would probably not apply to a remotely controlled unmanned ship due to its current wording. According to the wording in its Article III, the STCW Convention only applies to seafarers serving on board seagoing ships. Unless the people remotely controlling the vessel are considered to be the “serving on board”

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: According to Part 4 of Section A-VIII/2, an effective and appropriate watch are maintained at all times for the purposes of safety while the ship is anchored or moored, and if the ship is carrying hazardous cargo, the organization of such watch or watches take full account of the nature, quantity, packing and stowage of the hazardous cargo and any of the special conditions prevailing on board, afloat or ashore. As described in answer 5.1, the STCW Convention would not apply to unmanned cargo ships.

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: This would depend upon many factors. The shipowner would be primarily liable. Depending upon the arrangement and contract with the manufacturer, the liability shall be divided. The injured party may take action against manufacturer also.

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: Equivalent to 1910 convention, the MS Act provides the fault based liability regime in section 345, which exhaustively governs all collision cases so that there is no room for the introduction of a strict liability in connection with collisions involving unmanned vessels.

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