

**RESPONSE OF MLA TO
CMI QUESTIONNAIRE RE UNMANNED SHIPS**

Preamble

U.S. domestic maritime law is not concerned with the definition and classification of “ships,” but is instead drawn in terms of “vessels.” In that regard, there are both statutory, regulatory and general maritime law sources of definition and classification. The U.S. Congress has defined a “vessel” without regard to its need for operational manpower in Title 1 U.S. Code §3 as follows:

The word “vessel” includes every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water.

The U.S. Supreme Court has put a gloss on that definition (in a case involving a maritime lien claim upon a houseboat) as follows:

“Not every floating structure is a ‘vessel’ [A] structure does not fall within the scope of the statutory phrase unless a reasonable observer, looking to the [thing’s] physical characteristics and activities, would consider it designed to a practical degree for carrying people or things over water.”

Lozman v. City of Riviera Beach, 568 U.S. 115, 121 (2013) (emphasis in original).

Neither “watercraft” nor “artificial contrivance” is specifically defined in U.S. statutes.

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 computerized collision avoidance system, without any human supervision

constitute a “Ship” under your national merchant shipping law?

RESPONSE: Yes to both 1.1.1 and 1.1.2

- 1 U.S.C. § 3: “The word "vessel" includes every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water.”

- 18 U.S.C. § 2280(5): “‘covered ship’ means a ship that is navigating or is scheduled to navigate into, through or from waters beyond the outer limit of the territorial sea of a single country or a lateral limit of that country's territorial sea with an adjacent country”; see also 47 U.S.C. § 153(46)(A) “The term ‘ship’ or ‘vessel’ includes every description of watercraft or other artificial contrivance, except aircraft, used or capable of being used as a means of transportation on water, whether or not it is actually afloat.”

- *Lozman v. City of Riviera Beach*, 568 U.S. 115 (2013).

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

RESPONSE: The manning status or manner of operation of a “vessel” is not a question raised with respect to the qualification for registry (or “documentation”) under U.S. flag. Rather, the proper or minimum manning (if any) of a U.S. flagged vessel is generally considered by the U.S. Coast Guard in the course of issuance of a Certificate of Inspection (“COI”), which is required for most classes/types of vessels. (Recreational vessels and commercial fishing vessels are examples of vessels which may be entitled to registration/documentation as U.S. flagged vessels but which are allowed to operate without a COI.) 46 USC §8101 states: “The Certificate of Inspection issued to a vessel . . . shall state the complement of licensed individuals and crew considered by [the Coast Guard] to be necessary for safe operation.” That same section states that “a manning requirement imposed on –

- (1) A sailing school vessel shall consider the participation of sailing school instructors and students in the operation of that vessel;
- (2) A mobile offshore drilling unit shall consider the specialized nature of the unit; and
- (3) A tank vessel shall consider the navigation, cargo handling, and maintenance function of that vessel for protection of life, property and the environment.”

The statute allows the modification of the crew complement “for reasons of changed conditions or employment” 46 USC §8101(b) and does allow the owner of the vessel to appeal the imposed manning requirement to the Secretary of the Department of Homeland Security (in which the U.S. Coast Guard operates) 46 USC §8101(c).

The U.S. Coast Guard’s internal guidance document, The Merchant Marine Safety Manual (“MSM”) at Volume III, provides instructions to the Officers in Charge of Marine Inspection (“OCMI”) as to their decision-making for manning requirements for each COI issued. Importantly, Chapter 6 of Part B of that volume specifically deals with “Manning Requirements for Automated Vessels.” This chapter has obviously grown out of applications by vessel owners for reduced manning requirements in situations where vessels are equipped with such devices as constant tension mooring winches and automated engineering systems. The statement of general purpose says “Coast Guard acceptance of automated systems to replace specific personnel or to reduce overall crew requirements is predicated upon the capabilities of the system, its demonstrated and continuing reliability, and a planned maintenance program that ensures continued safe operation.”

There are a handful of statutes by which Congress has specified directly or indirectly some minimum crew/officer requirements for certain types of U.S. vessels. For example, the U.S. Coast Guard does not have unfettered discretion with respect to the manning of “merchant

vessels of more than 100 gross tons” because 46 USC §8104(d) requires that “the licensed individuals, sailors (etc.) shall be divided, when at sea, into at least three watches, and shall be kept on duty successively to perform ordinary work incident to the operation and management of the vessel.” On its face, this requires the minimum employment of at least three licensed mates and/or licensed three engineers.

Moreover, 46 USC §8301 specifies the minimum number of licensed individuals which certain vessels have to engage as officers. For example, “a vessel subject to inspection . . . propelled by machinery or carrying passengers shall have a licensed master” and “a vessel subject to inspection . . . of at least 1,000 gross tons . . . and propelled by machinery shall have three mates.” That same statute prescribes minimum officer requirements for a number of different sizes and types of inspected vessels, dependent in some instances upon how far offshore the vessel operates. (The minimum number of unlicensed crewmembers is not prescribed by statute for any type of vessel.)

The U.S. statutes also contain various other *ad hoc* requirements for the presence on board of licensed personnel on certain vessels, even uninspected vessels, under certain circumstances. For example, vessels of a certain minimum size operating in the bays, rivers, harbors and ports of the United States must be under control of a pilot licensed either under the laws of a state (foreign flagged vessels and U.S. flagged vessels sailing “under register”) or by the U.S. Coast Guard (U.S. flagged vessels on coastwise voyages). Small passenger or freight vessels (less than 100 gross tons) “shall be operated” by an individual licensed by the Coast Guard. 46 USC §8902, 8903. A towing vessel that is 26 feet long must also “be operated” by a licensed individual. 46 USC §8904.

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?

RESPONSE: For general purposes, whether or not a structure is a “vessel” under United States law is a question of statutory interpretation. See *Lozman*, 568 U.S. at 121 (refining the statutory definition of “vessel”). And, as alluded to above, most U.S. regulations and statutes incorporate the same specific definition of the term (with slight variation), including the regulations governing the registration and documentation of U.S.-flagged vessels. 46 C.F.R. § 67.3 (“Vessel includes every description of watercraft or other contrivance capable of being used as a means of transportation on water, but does not include aircraft.”). The U.S. Coast Guard’s National Vessel Documentation Center determines, on application by the owner, whether a particular structure meets this definition and the owner has a right to appeal that decision within the Coast Guard, 46 C.F.R. § 1.03-45, and, from there, to a federal court, 5 U.S.C.A. § 703 (West 2017). Thus, to some extent, the Coast Guard 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.

RESPONSE: Yes as to 1.4.1 - the “the chief on-shore remote controller”. Currently no as to 1.4.2 and 1.4.3.

- 46 U.S.C. §10101(1) “‘master’ means the individual having command of a vessel.”

- *Spentonbush/Red Star Cos. v. NLRB*, 106 F.3d 484, 488 (1997).

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

RESPONSE: No.

- Black's Law Dictionary defines "crew" as "the aggregate of seamen who man a ship or vessel, including the master and officers; or it may mean the ship's company, exclusive of the master, or exclusive of the master and all other officers."
- 46 U.S.C. §10101(3) "seaman" means an individual (except scientific personnel, a sailing school instructor, or a sailing school student) engaged or employed in any capacity on board a vessel.
- *United States v. Winn*, 28 F. Cas. 733, 734 (1838) which discusses generally what comprises the crew / ship's company.
- <http://www.nolo.com/legal-encyclopedia/who-qualifies-seaman-under-the-jones-act.html>
- 46 CFR § 125.160 which states "Crew means all persons carried on board the OSV to provide navigation and maintenance of the OSV, its machinery, systems, and arrangements essential for propulsion and safe navigation or to provide services for other persons on board."

2.1 Do you foresee any problems in treating 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?

RESPONSE: Because "vessel" is defined under United States law without regard for manning, unmanned vessels probably are subject to the same rights and obligations under the Law of the Sea as it is applied in the United States as are traditionally-manned vessels. For example, although the United States has not ratified UNCLOS, it has ratified the Convention on the Territorial Sea and the Contiguous Zone (ratified Apr. 12, 1961) which uses the same definition for "innocent passage" as does UNCLOS: "Passage is innocent so long as it is not prejudicial to the peace, good order or security of the coastal State." Apr. 29, 1958; 15 U.S.T. 1606, T.I.A.S. No. 5639.

There is effectively no U.S. law regarding the meaning of “innocent passage” and the power of the federal and state governments to interfere with innocent passage by foreign-flagged vessels. In *Mayaguezanos por la Salud y el Ambiente v. United States*, however, the U.S. district court for the District of Puerto Rico held that the federal government could not interfere in the innocent passage of foreign vessels to prevent them from carrying nuclear waste through its territorial waters. 38 F. Supp. 2d 168, 178 (D.P.R.), *aff’d but criticized*, 198 F.3d 297 (1st Cir. 1999). Despite concerns regarding the scope and applicability of this opinion,¹ it is consistent with the principle implied in the effectively single statutory definition of “vessel” under U.S. law: because a craft that is a vessel for one purpose also is a vessel for nearly every other purpose under the law, once a craft is determined to be a vessel, it is imbued with all of the rights and obligations concomitant with that status.

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 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?

RESPONSE: Because the United States has not ratified UNCLOS, it is not bound by the manning requirements in Article 94, except to the extent that those requirements reflect customary international law. The United States fulfills its obligations as a flag state under customary international law and the conventions by which it *is* bound (*e.g.*, COLREGs, SOLAS), via statutory and regulatory law. These sources of law could be altered to permit U.S.-flagged unmanned vessels or regulate their use or operations in accordance with IMO measures, or

¹ The First Circuit Court of Appeals criticized the district court’s opinion because the transits were occurring in the United States’ exclusive economic zone, rather than its territorial waters, such that innocent passage was not actually implicated. 198 F.3d at 305. Moreover, it criticized the breadth of the district court’s holding that the United States has no authority to interfere in the innocent passage of vessels carrying nuclear waste in its territorial waters. *Id.* at 305, n.15.

otherwise. The principle limitations on such changes would come not from UNCLOS, but rather the extent to which vessels permitted under these altered standards would comply with COLREGs and SOLAS manning requirements.

3.1 Does your national law implementing 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?

RESPONSE: SOLAS Regulation 14 is implemented through existing domestic law found in Title 46, Part F of the United States Code and Part 15 of Title 33, Code of Federal Regulations. Please see the discussion in response to 1.2 above. In addition, U.S. law requires owners to maintain watchmen in the vicinity of passenger cabins on each deck during nighttime hours to help sound an alarm if necessary. (46 USC § 8102). Hence, passenger vessels cannot be operated without a watch on each deck.

The period in which watchstanders may work in a single day *at sea* is governed by 46 USC §8104. For instance, on an oceangoing or coastwise vessel of not more than 100 gross tons, licensed officers may not be required to work more than 9 hours a day in port and 12 hours while at sea. This statute repeatedly refers to “leaving port” and “while at sea” indicating that it is presumed that officers will actually perform work aboard the vessel.

Minimum manning requirements for licensed officers are found in 46 USC § 8301. This statute merely requires owners/operators of vessels to “engage” a minimum number of licensed officers, stating that each variety/size of vessel shall “have” the required number of officers. The Secretary of Homeland Security may suspend this minimum manning during a national emergency and/or may require additional manning if necessary for “safe operation.” Although

this statute is often interpreted to require the licensed officers to be aboard the vessel, the actual language does not require the officers to be aboard. Courts, however, read in the requirement that officers must be aboard. (See *Matter of Grace Line, Inc.*, 397 F.Supp. 1258, aff'd 517 F.3d 404 (S.D.N.Y. 1973).

Crew manning requirements are set forth in 46 USC § 8702. This statute does not require crewmembers to be aboard the vessel, but it does identify ratios of able seamen/ordinary seaman for crew aboard. In essence, the statute may be a nullity if no crew is assigned to the vessel as it presumes the vessel has crew.

Chapter 89 of Title 46, United States Code establishes the license required to "operate" vessels of different sizes and/or capabilities (freight, small passenger, towing, etc.). In each instance, the statute does not require that the licensed person be aboard the vessel, merely that it be "operated" by a licensed person. (See 46 USC §§ 8901 *et seq.*).

Despite the shortcomings found in the language of U.S. statutes identified above, the implementing Code of Federal Regulations clarify the language sufficiently to remove any ambiguity of the necessity for onboard crew. Federal regulations state:

The navigation and shipping laws state that a vessel may not be operated unless certain manning requirements are met. In addition to establishing a minimum number of officers and rated crew to be carried onboard certain vessels, they establish minimum qualifications concerning licenses and MMC endorsements, citizenship, and conditions of employment. . . .

46 CFR§15.105(b). This provision further states that it is the responsibility of the owner and master, among others, to ensure that appropriate personnel are "carried" to meet the requirements of the law.

No vessel may be navigated unless it has in its service *and onboard* the crew requirement required by the Certificate of Inspection. 46 CFR § 15.515(a). This requirement applies to all inspected US flag vessels, regardless of purpose. However, 46 CFR § 15.715 provides that the

USCG may accept automated systems to replace specific personnel or to reduce overall crew requirements predicated on the capabilities of the system. The system must be demonstrated to be reliable and a planned maintenance program must exist to ensure continued safe operation of the vessel.

In summary, although some U.S. manning statutes do not specify that crew and officers must be aboard, implementing regulations generally clarify that for at least inspected vessels, the crew complement must be aboard the vessel.

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?

RESPONSE: Several provisions in the United States Code of Federal Regulations provide for certification of navigation bridge visibility in accordance with Regulation 15 of SOLAS Chapter V. (See *e.g.* 46 CFR § 72.04-1) These regulations require that every applicable vessel be equipped with a navigation bridge that provides the requisite arc of visibility including a 60 degree arc of windows. The regulations do not actually require that vessel operations be conducted from the navigation bridge or operating station but it was certainly assumed by the USCG that they would be. However, it is clear that if an autonomous vessel is going to be constructed it must be built with a navigation bridge/operating station even if crewmembers will not be aboard. This is not surprising since there may be times when even autonomous vessels must be “manually conned”.

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.)?

RESPONSE: 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. U.S. law codifies this obligation at 46 USC § 2304 which states that a master of a vessel shall render assistance to any individual found at sea in danger of being lost, so far as the master can do so without serious danger to the master's vessel or individuals on board.

An unmanned vessel operated by a remote master may not fail to proceed with all reasonable speed to assist persons/vessels in distress. Although no crew is aboard the unmanned vessel, valuable assistance may be rendered to the distressed persons. For instance, the unmanned vessel can assist by marking precisely the location of the distressed persons or vessel, the vessel may provide a shelter for those abandoning a sinking vessel, and finally the unmanned vessel may provide invaluable video images from the distress scene until more capable assistance arrives. The only aid that cannot be provided by the unmanned vessel is putting aboard damage control equipment or rendering assistance in leaving the distressed vessel and boarding the unmanned vessel. Domestic courts in the United States would look unfavorably on any decision not to meet the obligation to render aid in distress.

Proper response to a distress call would only be an issue for autonomous vessels that do not deviate from track. A remote-controlled vessel can monitor distress frequencies and deviate from track to render assistance in the same manner as a manned vessel.

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?

and

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?

RESPONSE: These questions assume the occurrence of a collision involving a ship "without any on-board personnel" that was either remotely controlled or autonomous and ask if the interpretation of the COLREGs by U.S. national law would say that the ship was in violation of the principle of "good seamanship" regardless of the safety credentials of the remote control or autonomous system. An admittedly modest amount of research has failed to discover any case law spawned by any such collision.

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?

RESPONSE: Decisional law in the U.S. has held that the failure to employ available technology to avoid collision can be a breach of the duty of reasonable care. However, the law has also been uniform to the effect that technology such as radar/ARPA cannot substitute for a human lookout. It is nevertheless possible that a sufficiently sophisticated on-board system that would enable "sight and hearing" for a remote human controller equivalent to that which could be attained by a lookout stationed on the bridge and/or bow of the vessel would be satisfactory under Rule 5.

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?

RESPONSE: The "vessel not under command" classification would probably not include a remotely-controlled vessel, which vessel is in fact being commanded, albeit remotely. An

autonomous vessel might literally fit the definition due to a lack of "hands on" control, but the COLREGs are built upon the assumption that the vessel did not voluntarily surrender its ability to sail or steer. If the owner of a vessel purposely avoids controlling or commanding his vessel, it would not be entitled to the benefits conferred by Rule 18 of the COLREGs that would require all other vessels to stay clear. The analogous case is that of the naval vessel that opts to run "darkened ship", i.e., without navigation status lights, thus creating risk of collision. Such a vessel, irrespective of the navigational situation, would be obliged to keep clear of all other vessels. See, e.g., *United States v. AUSTRALIA STAR*, 172 F.2d 472 (2d Cir. 1949); *Lind v. United States*, 156 F.2d 231 (2d Cir. 1946).

5. The International Convention on Standards of Training Certification and Watchkeeping 1978 (STCW Convention)

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?

RESPONSE: We believe it would apply until modified.

- <http://www.imo.org/en/OurWork/HumanElement/Pages/Default.aspx>
- *Kelly v. Keystone Shipping Co.*, 281 F. Supp. 2d 313, 321 (2003) which discusses the STCW in the context of the Coast Guard's regulatory power to determine licensing and training requirements for merchant seaman.
- STCW (Article III - <http://www.admiraltylawguide.com/conven/stcw1978.html>)

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)?

RESPONSE: Probably to both parts of 5.2; however, revisions to U.S. federal regulations and the STCW would be advisable.

- Rule 5 “Every vessel shall at all times maintain a proper look-out 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.”
- *In re Otal Invs. LTD*, 2014 AMC 258 (S.D.N.Y. Dec. 17, 2013) which discusses proper lookout procedures in restricted visibility and the need for additional lookouts in certain circumstances.
- STCW (Chapter II, Regulation II/1; Chapter III, Regulation III/1) and
- See also, 46 U.S.C. § 8301 which details the number of licensed mariners certain vessels are required to “engage”.

6. Liability

6.1. **Suppose a "ship" was navigating autonomously i.e. through an entirely computerized navigation I 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?**

RESPONSE: The trier of fact would apportion it comparatively and the conclusion would be dependent upon a detailed factual analysis of the collision.

- *Quinn v. Southgate Nelson Corp.*, 121 F.2d 190, 191 (1941).
- *In re Complaint of Delphinus Maritima, S.A.*, 523 F. Supp. 583, 597 (1981).
- *McDermott, Inc. v. Amclyde*, 511 U.S. 202 (1994).
- *Exxon Co., U.S.A. v. Sofec, Inc.*, 517 U.S. 830 (1996).
- *United States v. Reliable Transfer Co.*, 421 U.S. 397 (1975).

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?

RESPONSE: In U.S. courts fault would be apportioned comparatively by the trier of fact and be dependent upon a detailed factual analysis of the collision, however, a United States court will apply the 1910 Collision Convention when a collision occurs in international waters between vessels that fly flags of signatory states. *See, e.g., Seiriki Kisen Kaisha and Dragon Navigation, S.A. v. Stena Freighter*, 629 F. Supp. 1374 (S.D.N.Y. 1986).