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 adaptions 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. Would a “cargo ship” in excess of 500 grt, without a master or crew onboard , which is either
		1. controlled remotely by radio communication?
		2. controlled autonomously by, inter alia, a computerised collision avoidance system, without any human supervision

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

* 1. Would an unmanned “ship” face difficulty under your national law in registering as such on account of its unmanned orientation?
	2. 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?
	3. Under your national merchant shipping law, could either of the following constitute the unmanned ship’s “master”
		1. The chief on-shore remote-controller
		2. The chief pre-programmer of an autonomous ship
		3. Another 'designated' person who is responsible on paper, but is not immediately involved with the operation of the ship
	4. Could other remote-controllers constitute the “crew” for the purposes of your national merchant shipping laws?
1. United Nations Convention on the Law of the Sea, 1982 (UNCLOS)

* 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?
	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?
1. IMO Conventions – The International Convention for the Safety of Life at Sea (SOLAS) 1974 (as amended)
	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?
	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?
	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.)?
2. The International Regulations for Preventing of Collisions at Sea, 1972 (COLREGS)
	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?
	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?
	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?
	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?
3. The International Convention on Standards of Training Certification and Warchkeeping, 1978 (STCW Convention)
	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?
	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)?
4. Liability
	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?
	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?