

THE INTERNATIONAL DUTY TO ASSIST PEOPLE IN DISTRESS AT SEA IN THE ERA OF UNMANNED NAVIGATION: NO PLACE FOR PEOPLE ON BOARD

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Abstract: In the last decade, the first Maritime Autonomous Surface Ships (MASS) have been tested and produced by private companies. The growing use of unmanned vessels seriously challenges the development of the whole international legal framework concerning navigation. In particular, these new means of maritime transport impose a deep reflection on their capability to concretely assist people in distress at sea. The present paper analyses how public international rules on rendering assistance at sea adapt to the utilization of MASS. Following a brief introduction, this work starts with a description of the rise of the technology of automation and control in the maritime field, in order to highlight the principal elements of novelty introduced by the use of MASS in the field of maritime transport. Subsequently, it reports and analyzes the international rules regulating the duty over States of rendering assistance to people in distress at sea. In the third paragraph, the script deals with the issues rising from the application of the above-mentioned norms to the use of unmanned ships. More precisely, it discusses whether the absence of a master on board precludes the operability of these norms to the use of MASS, and, subsequently, which kind of assistance shall be effectively provided by ships whose design is not conceived to host persons on board. Finally, the last pages of this work provide conclusive reasoning emerged from the legal analysis previously exposed, also by addressing the relevance of economic interests in the definition of the level of assistance required by law.

Keywords: Unmanned ships. International Law of the Sea. UNCLOS. Duty to render assistance at sea. MASS.

1. Introduction

Rendering assistance to people in distress at sea is one of the pillars on which the millenary maritime culture is founded. This moral and ethical obligation is intrinsically part of the human activity of navigation: the duty is “as old as seafaring itself”².

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² SEVERANCE A., *The Duty to Render Assistance in the Satellite Age*, 36 Cal. W. Int'l L.J. 377, (2006), 377.

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As known, Public International Law transposes this principle of humanity into its legal framework. Since the beginning of the twentieth century, the obligation has been codified by several international conventions concerning the regulation of navigation. At the state of art, there is no doubt that the duty to assist people at sea is part of general International Law.

In the last decade, due to situations of emergency involving thousands of migrants, refugees and asylum seekers, many academic studies have addressed the limits and the inconsistencies of the above-mentioned international rules. In particular, scholars have focused their attention on the malfunctioning of States' search and rescue services and on the issue of the identification of a "place of safety" for the disembarkation of people. However, the implementation of the technologies of automation and control in the field of maritime transport is bringing to light unexplored legal - and ethical - considerations concerning the scope of application of this fundamental duty.

In the last few years, the first Maritime Autonomous Surface Ships (MASS) have been tested and produced. The use of unmanned³ commercial vessels seriously challenges the development of the whole international legal framework concerning navigation. In particular, these new means of maritime transport, which navigate without the presence of a master and seafarers on board, impose a deep reflection on their capability to concretely assist people in distress at sea. Indeed, it is difficult to understand how these ships can concretely save life at sea, since they are not conceived to host people on board.

In other words, how the phrase "to render assistance to people at sea" must be interpreted when dealing with unmanned navigation? Is the use of MASS exempted from complying with this obligation? Is it lawful to produce unmanned ships unable to rescue people at sea? The present paper aims to address these questions. It analyses how public international rules on rendering assistance at sea adapt to the utilization of such new unmanned vehicles.

The structure of this work is based on the following scheme.

³ The recourse of the terms "manned" and "unmanned" in this article is due to a methodological choice, since they are constantly used by the specialized literature and by the conventions analysed. However, it should be noted that this terminology is contested because of concerns on the unequal treatment between genders, and the term 'human' should be prioritized. For more information on this debate, see PAPANICOLOPULU I.(ed.), *Gender and the Law of the Sea*, Leiden, (2019).

The first paragraph provides a general overview on the production of MASS and on the rise of a florid legal debate concerning their growing use in the field of maritime transport.

Then, the following paragraph reconstructs the international normative framework concerning the duty to assist people in distress at sea. More precisely, it analyses the obligations provided by the United Convention on the Law of the Sea (UNCLOS)⁴, the Convention for the Safety of Life at Sea (SOLAS)⁵ and the International Convention on Salvage⁶.

From this perspective, the third section intends to evaluate whether and how these rules can be applied to MASS or not.

Finally, the last pages of this work provide conclusive observations rising from the legal analysis previously exposed.

2. Automation and control in the shipping sector: the rise of a new debate on the international regulation of navigation

Due to the advent of automation and control technologies in the maritime field, the traditional activity of navigation does not necessarily require the presence of people on board anymore. This disruptive innovation offers big opportunities for the shipping industry: it can maximise profits from transport of goods at sea - which amounts approximately to 90% of international trade⁷. Moreover, in terms of maritime safety, the innovation of remote control can reduce the risk of maritime accidents, which are frequently caused by human mistakes⁸.

For the above reasons, in the last decade many projects have been financed by national and private entities and the first MASS have been tested and produced.

⁴ United Nations Convention on the Law of the Sea (UNCLOS), Montego Bay, signed in 1982, entry into force in 1994. To date, 167 State are parties to the present convention.

⁵ International Convention for the Safety of Life at Sea, 1974 (entered into force 25 May 1980), as amended. The SOLAS Convention currently has 165 States Parties, the combined merchant fleets of which constitute approximately 99.04% of the gross tonnage of the global merchant fleet.

⁶ International Convention on Salvage, 28 April 1989 (entered into force 14 July 1996). The Convention has been ratified by 69 state, the combined merchant fleets of which constitute approximately 52% of the gross tonnage of the global merchant fleet.

⁷ UNCTAD, *50 Years of Maritime Transport, 1968-2018*, New York, (2018), 4.

⁸ GRECH M. R.; HORBERRY T. J.; KOESTER T., *Human Factor in the Maritime Domain*, London, (2008), 17-18.

With the acronym MASS, we intend innovative means of maritime transport which are capable to navigate in the absence of any crew on board. Within this classification, MASS are sub-divided in (i) remotely controlled ships, which presuppose the command of on-shore operators, and (ii) fully autonomous ships, characterized by the complete independence from the human element in the decision-making loop; in any case, the supervision of remote operators is still necessary⁹.

The construction and the use of MASS is not a futuristic event; it is one of the most important challenges faced by the shipping industry during these years. Similarly to many other technological innovations, the production of unmanned commercial vessels follows the more advanced field of military engineering, which has been providing States with maritime unmanned vehicles for years¹⁰. Nowadays, the construction of MASS for commercial purposes has already started; States and private entities are both paying close attention to this technological development.

Just to provide some examples, with regard to private companies, in 2016, Rolls Royce announced a massive plan for the production of ships based on autonomous systems¹¹. Then, Norway's Kongsberg and Finland's Wärtsilä have started investing in the same market. Moreover, other important business players constituted One Sea¹², an international joint venture, with the aim to "lead the way towards an operating autonomous maritime ecosystem by 2025"¹³.

With regard to public investments, Asian and north European countries are at the vanguard in developing this new technology. More precisely, States like China, Singapore, South Korea, Japan, Norway, Denmark and United Kingdom are investing huge resources to

⁹ In order to better explain this technological revolution, *Lloyd's Register*, a well-known UK classification society, set a scale of definitions of the existing autonomy levels potentially achievable by ships. According to this classification, nowadays the shipping industry can configure extremely high levels of automation, by which "the ship is controlled and operated from another location" and, in some cases, "the operating system of the ship is able to make decisions and determine actions by itself". Following the statements of Lloyd's, these definitions have been adopted by IMO (MSC 99/5, *Regulatory Scoping Exercise for the use of Maritime Autonomous Surface Ships* (MASS), 13 march 2018). In this document, the category of MASS includes two more classes of ships, characterized by lower levels of automation. However, in this research, our attention is exclusively focused on *unmanned* MASS.

¹⁰ For a detailed legal analysis on the military use of unmanned maritime vehicles, see SCHMITT M., GODDARD S., *International Law and the Military Use of Unmanned Maritime Systems*, International Review of the Red Cross, (2016), 567-592.

¹¹ AAWA, *Remote and Autonomous, Ships: The Next Steps*, 2016.

¹² For all the information about *One Sea*, visit the website www.oneseaecosystem.net.

¹³ *Ibid.*

adapt their ports and facilities to the navigation of these new means of maritime transport¹⁴. Simultaneously, they have also started to take the very first steps towards national regulations on the use of ships controlled through automation¹⁵.

The striking revolution brought by MASS is able to revolutionize the modalities by which the transport of goods at sea is traditionally conducted: a new relationship between ships and their users is developing. At the same time, the international legal system regulating navigation is challenged by the use of MASS; due to the fact that human involvement in the conduction of this activity changes, Public International Law is called to adapt itself with regard to this technological revolution.

During the last years, this legal puzzle gained an increasing attention from States and international organizations. In particular, in 2018, the International Maritime Organization (IMO)¹⁶ started a “Regulatory Scoping Exercise on Maritime Autonomous Surface Ships (MASS)”¹⁷, which will be concluded at the end of 2020. Moreover, several scholars addressed the same issue as well¹⁸.

¹⁴ *ABB to bring autonomous technology to the Port of Singapore*, ABB news, 21 October 2019; Gov.uk, 23 October 2019; *Artificial intelligence ship technology to be trialled in Portland Harbour*, Dorset Echo, 29 October 2019; *Test site to help develop autonomous ship work, South Korea embarks on ambitious autonomous ship project*, The Korea Herald, 30 October 2019; Seatrade Maritime News, *China’s first autonomous cargo ship makes maiden voyage*, 16 December 2019.

¹⁵ Just to provide some examples, see Japan Ship Technology Research Association (JSTRA), *Regulatory Barriers and Possible Solutions for the use of Maritime Autonomous Surface Ships (MASS)*, March, 2018; Danish Maritime Authority Report, *Analysis of Regulatory Barriers to the Use of Autonomous Ships*, December 2017; Norwegian Forum for Autonomous Ships, *Definitions for Autonomous Merchant Ships*, 2017; Finnish Pilotage Act, amendments up to 51/2019 included, 2019; Maritime UK, *Maritime Autonomous Surface Ships UK Code of Practice*, 2019.

¹⁶ Founded in London in 1948, IMO is the first international organization with general competence over shipping and maritime matters. In the last decades, the Organization has coordinated the promulgation of more than forty international treaties about many aspects related to navigation. Being a specialized agency of the United Nations, IMO operates in strict contact with the U.N. Secretariat.

¹⁷ IMO, MSC 99/5, *Regulatory Scoping Exercise for the use of Maritime Autonomous Surface Ships (MASS)*, 13 march 2018.

¹⁸ BAUGHEN S., *Who is the master now?*, in SOYER B.; TETTENBORN A. (ed.), *New Technologies, Artificial Intelligence and Shipping Law in the 21st Century*, London, (2019), 129-147; CHIRCOP A., *Maritime Autonomous Surface Ships in International Law: New Challenges for the Regulation of International Navigation and Shipping*, Cooperation and Engagement in the Asia-Pacific Region, (2019), 18-32; KLEIN N., *Maritime Autonomous Vehicles within International Law Framework to Enhance Maritime Security*, International Law Studies, (2019), 244-271; RINGBOM H., *Regulating Autonomous Ships – Concepts, Challenges and Precedents*, Ocean Development & International Law, (2019), 141-169; CHIRCOP A., *Testing International Legal Regimes: The Advent of Automated Commercial Vessels*, German Yearbook of International Law, (2018); EDER B., *Unmanned Vessels: Challenges Ahead*, Inaugural Francesco Berlinghieri Lecture, CMI, (2018); J. DELGADO, *The Legal Challenges of Unmanned Ships in the Private Maritime Law: What Laws would You Change?*, Port, Maritime and Transport Law between Legacies of the Past and Modernization, (2018); CAREY L., *All Hands off Deck? The Legal Barriers to Autonomous Ships*, NUS Centre for Maritime Law, (2017); CHWEDCZUK M., *Analysis of the Legal Status of Unmanned Commercial Vessels in U.S. Admiralty Law and Maritime Law*, Journal of Maritime Law & Commerce, (2016), 123-169; VAN HOOYDONK H., *The Law of Unmanned Merchant Shipping - An Exploration*, Journal of International Maritime Law, (2014), 402-423.

The emergent legal discussion aims to generally understand how the use of MASS complies with the international legal rules actually in force, which were clearly drafted in the light of a different understanding of the activity of navigation.

Among the numerous issues raised from this technological innovation, one of the most critical is whether and how the use of MASS shall be adapted to the fundamental duty to assist people in distress at sea; the following pages aim to address this legal question.

3. The international duty to render assistance to people in distress at sea

It is indisputable that Public International Law imposes the obligation to save people in distress at sea. Since the redaction of the draft articles for the adoption of the Convention on the High Seas of 1958¹⁹, the International Law Commission (ILC) considered this ethical maxim as part of general law²⁰. According to authoritative scholars, this duty reflects a sacred and ancient maritime tradition²¹. Nowadays, many international conventions transpose this general principle²² in written rules.

Among the others, article 98 of UNCLOS prescribes that:

“1. Every State shall require the master of a ship flying its flag, in so far as he can do so without serious danger to the ship, the crew or the passengers:

(a) to render assistance to any person found at sea in danger of being lost;

(b) to proceed with all possible speed to the rescue of persons in distress, if informed of their need of assistance, in so far as such action may reasonably be expected of him;

(c) after a collision, to render assistance to the other ship, its crew and its passengers and, where possible, to inform the other ship of the name of his own ship, its port of registry and the nearest port at which it will call.

2. Every coastal State shall promote the establishment, operation and maintenance of an adequate and effective search and rescue service regarding safety on and over the sea and,

¹⁹ Convention on the High Seas, 1958, article 12,1.

²⁰ Report of the International Law Commission, 8th Session, Apr. 23–July 4, 1956, art. 36, U.N. Doc. A/3159; U.N. GAOR, 11th Sess., Supp. No. 9 (1956).

²¹ COLOMBOS C. J., *The International Law of the Sea*, London, (1967), 369; O’CONNELL D. P., *The International Law of the Sea*, Vol. II, New York, (1982), 807.

²² According to relevant scholars, the duty to render assistance can be considered as a general principle “recognized by civilized nations [article 38(c) of the Statute of the International Court of Justice]. See PAPANICOLOPULU I., *The duty to rescue at sea, in peacetime and in war: A general overview*, International Review of the Red Cross, (2016), 494.

where circumstances so require, by way of mutual regional arrangements cooperate with neighbouring States for this purpose”²³.

From the reading of this provision, it must be specified that the general duty to save life at sea is composed of two different obligations: the first one (art. 98,1) imposes States to require that the masters of ships flying their flag shall render assistance to any person in distress at sea, while the second one (art. 98,2) obliges coastal States to promote and cooperate for an adequate functioning of “search and rescue (SAR) services”²⁴.

As previously pointed out, in the last years many doctrinal studies have been conducted with particular regard to this latter rule²⁵. Instead, our analysis continues by exclusively addressing the former.

As far as the first mentioned duty is concerned, the provision described in article 98,1 of UNCLOS is completed by other conventional rules. Indeed, regulation V/33(a) of SOLAS states that:

“The master of a ship at sea which is in a position to be able to provide assistance on receiving information from any source that persons are in distress at sea, is bound to proceed with all speed to their assistance, if possible informing them or the search and rescue service that the ship is doing so [...]”²⁶.

Again, article 10 of the International Convention on Salvage affirms:

“Every master is bound, so far as he can do so without serious danger to his vessel, and persons thereon, to render assistance to any person in danger of being lost at sea [...]”²⁷.

The contextual reading of these provisions allows to go deeper in the analysis on the international duty to render assistance at sea. In particular, three critical aspects need to be

²³ UNCLOS, article 98.

²⁴ In KENNEY F.; TASIKAS V., *The Tampa Incident: IMO Perspectives and Responses on the Treatment of Persons Rescued at Sea*, 12 Pac. Rim L. & Pol’y J. 143, (2003), 156, the author defines the first rule as the duty to render assistance, while names the latter as the obligation to rescue. The topic is better analyzed in PAPANICOLOPULU I., *The duty to rescue at sea, in peacetime and in war: A general overview*, cit.

²⁵ TREVISANUT S., *Recognizing the Right to be Rescued at Sea*, in CHIRCOP A.; COFFEN-SMOUT S.; MCCONNELL M.L. (eds.), *Ocean Yearbook*, Volume 31, Leiden, (2017), 139-154; RATCHOVIC M., *The Concept of ‘Place of Safety’: Yet Another Self-Contained Maritime Rule or a Sustainable Solution to the Ever-Controversial Question of Where to Disembark Migrants Rescued at Sea?* Australian Yearbook of International Law, Vol. 33, (2015). Recent works address such issue focusing their attention on the crossing application of rules belonging to the international regime of the Law of the Sea and that of Human Rights. See PAPANICOLOPULU I., *The duty to rescue at sea, in peacetime and in war: A general overview*, cit., 509-513; TREVISANUT S., *Is there a right to be rescued at sea? A constructive view*, QIL, Zoom-in 4, (2014), 3-15.

²⁶ SOLAS, regulation V/33(a).

²⁷ International Convention on Salvage, article 19.

specifically outlined: who are the subjects obliged by the law, what precisely is the normative content of the duty and, lastly, what are its exceptions.

With regard to the first, the identification of the subjects of the international duty under study is not intuitive step. Indeed, adopting a literal interpretation of written rules²⁸, while art. 98,1 of UNCLOS specifically refers to flag States as the subjects of the rule²⁹, it seems that the remaining two provisions oblige exclusively ship masters.

In our view, the correct interpretation is that flag States are the recipients of the conventional duties to render assistance to people in distress at sea. In fact, due to the traditional State-centeredness nature and normative structure of Public International Law³⁰, its rules typically set legal relationships over States and between States. Even if they deal with physical human activities, which are conducted by individuals and not by international subjects, the adopted normative technique is to conceive them through the lens of State's rights and duties³¹. This conclusion does not exclude the existence of an international obligation over masters to assist people in distress at sea. However, this paper is limited to dwell on the duty over flag States, since the present analysis deals with public legal relationships, and not with private international law issues.

Following this reasoning, is it now possible to focus our attention on the normative content of the international obligation over flag States. As far as this ground is concerned, it is important to first observe that the prescription analyzed merely imposes a general duty of conduct³²; States are obliged to make sure - through domestic legal instruments³³ - that

²⁸ As required by the criteria outlined by the Vienna Convention on the Law of Treaties, 1969, article 31.

²⁹ PAPANICOLOPULU I., *International Law and the Protection of People at Sea*, Oxford, (2018), 86. Again, see KENNEY F.; TASIKAS V., *The Tampa Incident*, cit., 153; SEVERANCE A., *The Duty to Render Assistance in the Satellite Age*, cit., 384.

³⁰ TREVES. T., *Law of the Sea*, Max Planck Encyclopedia of International Law, (2011).

³¹ With specific regard to UNCLOS regime, this position has been explicitly approved by the European Court of Justice, in the *Intertanko Case*, C-308/06, 2008, para. 62 : “[...] it is the flag State which, under the Convention, must take such measures as are necessary to ensure safety at sea and, therefore, to protect the interests of other States. The flag State may thus also be held liable, vis-à-vis other States, for harm caused by a ship flying its flag to marine areas placed under those States’ sovereignty, where that harm results from a failure of the flag State to fulfil its obligations”. This normative technique is better analyzed in PAPANICOLOPULU I., *The Law of the Sea Convention: No Place for Persons?*, *The International Journal of Marine and Coastal Law* 27, (2012), 872; ALLEN C., *Revisiting the Thames Formula: The Evolving Role of the International Maritime Organization and Its Member States in Implementing the 1982 Law of the Sea Convention*, *10 San Diego International Law Journal*, (2009), 265-334.

³² In International Law, these rules are known as “*due diligence obligations*”. In this research it is not possible to dwell on the normative nature and the related issues characterizing such obligations. For more information on this matter, among the others, see PISILLO MAZZESCHI R., *Due diligence e responsabilità internazionale degli Stati*, Milano, (1989); BARNIDGE R., *The Due Diligence Principle under International Law*, *International Law Community Review*, (2006); KOIVUROVA T., *Due diligence*, Max Planck Encyclopedia of International Law, (2010); KULESZA J., *Due Diligence in International Law*, Leiden, (2016).

masters of ships flying their flag shall render assistance to people in distress at sea. International Law does not specify how flag States have to fulfil this task, leaving them free to choose the concrete modalities.

However, in order to delimit the margin of appreciation of States in their decisions, it must be clarified what is the meaning to be given to the locution “rendering assistance at sea”, provided by the mentioned rules³⁴. Indeed, “assistance” is a broad term, which potentially goes from requiring masters to perform just informative operations (for instance, launching an S.O.S. signal and/or informing SAR services), up to extremely dangerous and cost-effective activities (rescue of persons in distress and disembarkation on land). This topic has been addressed by IMO in its resolution MSC.167(78) of 2004, which contains some guidelines on this matter³⁵. According to the Organization, International Law requires masters to do “everything possible, within the capabilities and limitations of the ship, to treat the survivors humanely and to meet their immediate needs”³⁶. Comprehensibly, the duty to assist people at sea does not extend to the point of prescribing activities that can endanger life of people on board and the integrity of the assisting ship. In other words, although its purpose is to guarantee the highest levels of safety for people in distress at sea, this duty cannot always consist of rescuing activities: masters have to evaluate which maximum level of assistance can be provided in the light of the existing circumstances³⁷.

The flexibility of these obligations is highlighted even more by observing which exceptions are provided by International Law. Indeed, article 98,1 of UNCLOS specifically excuses the non-compliance to this provision if the assistance can seriously endanger the ship, the crew or the passengers³⁸. Moreover, SOLAS excludes the mandatory nature of the duty if the circumstances make assistance “unable”, “unreasonable” and/or “unnecessary”³⁹.

³³ *Implications of the United Nations Convention on the Law of the Sea, 1982 for the International Maritime Organization, Study by the Secretariat of IMO*, I:\LEG\MISC\7.doc, January 19, 2012, p. 15 and 19.

³⁴ It has to be highlighted that, traditionally, the interpretation of the phrase “rendering assistance at sea” raised a further legal discussion, concerning whether the duty of assistance is fulfilled at very moment in which masters rescue people or, alternatively, if the duty ends only when people are disembarked in a “place of safety”. However, with regard to this paper, such topic is not particularly relevant, since the most critical concern regards the difficulty for unmanned ships in rescuing people on board.

³⁵ IMO, Resolution MSC.167(78), *Guidelines on the Treatment Of Persons Rescued At Sea*, 20 May 2004.

³⁶ IMO, Resolution MSC.167(78), *Guidelines on the Treatment Of Persons Rescued At Sea*, cit., p. 6.

³⁷ SEVERANCE A., *The Duty to Render Assistance in the Satellite Age*, cit., 387: “the master is only required to render assistance when reasonable, making it necessary to analyze each instance of failing to render assistance on a case-by-case basis”. This position is more recently affirmed by BAUGHEN S., *Who is the master now?*, cit., 136.

³⁸ UNCLOS, article 98,1.

³⁹ SOLAS, regulation V/33.

In any case, it is of pivotal importance to highlight that commercial reasons are not included among the various exceptions to the duty to assist people at sea⁴⁰. The master's discretion in evaluating the concrete capability for its ship to assist persons in distress is absolutely independent from the economic consequences eventually deriving from it. This position is not only supported by solid legal arguments, but also by ethical reasons, which, as previously observed, are the solid grounds which justify the existence of the duty to render assistance to people in distress at sea.

4. The applicability of the duty to assist people at sea to MASS

Once briefly outlined the features characterizing the international duty to render assistance at sea, it is now possible to dwell on the innovative issue of the applicability of this rule to the use of unmanned means of maritime transport. The topic approached is of particular concern, since the recent rise of MASS seriously undermines the protection of life guaranteed by International Law at the state of art.

Preliminary, the first rising question is whether the scope of application of the rule under study covers the use of such new maritime technology. In our view, rendering assistance at sea is mandatory every time navigation occurs, independently of the particular features of the ships. Indeed, regulation I/1 of SOLAS prescribes that the Convention applies to all ships engaging an international voyage⁴¹. Thus, every ship is potentially included, even "new" ones, as explicitly specified in regulation I/2⁴². The same conclusion is valid also for UNCLOS⁴³ and the International Convention on Salvage⁴⁴. This position is

⁴⁰ PAPANICOLOPULU I., *The duty to rescue at sea, in peacetime and in war: A general overview*, cit., 497-498.

⁴¹ SOLAS, Regulation I/1,(a): "Unless expressly provided otherwise, the present Regulations apply only to ships engaged on international voyages". The issue concerning whether MASS can be considered as ships or not is still open, however the prevailing position is to consider them as such. This topic is in depth analyzed by ALLEN C.H., *Determining the Legal Status of Unmanned Maritime Vehicles: Formalism vs Functionalism*, available on SSRN, (2018); VAN HOOYDONK H., *The Law of Unmanned Merchant Shipping - An Exploration*, cit.

⁴² SOLAS, Regulation I/2,(k): "New ship" means a ship the keel of which is laid or which is at a similar stage of construction on or after the date of coming into force of the present Convention".

⁴³ As manifestly declared at the beginning of the preamble, it is easy to extrapolate its pretense to regulate the maritime domain in a complete and universal way. The "Constitution of Oceans", as notoriously recalled by Koh, aims to represent not only the codification of pre-existent customary norms, but also the progressive development of the *entire* regime of the Law of the Sea. According to many scholars, its provisions have to be interpreted in an evolutionary way, covering also new maritime technological innovations not existing during the drafting of UNCLOS. See SCOTT S., *The LOS Convention as a Constitutional Regime for Oceans*, in ELFERINK A., *Stability and Change in the Law of the Sea: the Role of the LOS Convention*, Leiden 2005.

supported by a relevant number of States which have participated to a survey organized by the Comité Maritime International (CMI) on this matter: according to the majority of them, the mere fact that the ship is unmanned does not preclude the theoretical applicability of the duty of rendering assistance to people in distress at sea⁴⁵.

However, taking into account the peculiar features of MASS, further critical reflections arise. More in particular, two questions need to be answered: can this obligation be concretely applied if these ships have not a master on board? Again, what kind of assistance must be required to ships whose design is conceived not to host persons on board? These two fundamental issues are separately analyzed in the following sub-paragraphs.

a. The absence of a master on board

Although the master is not the international subject of the provision under study⁴⁶, Public International Law attributes a key role to this figure. Indeed, as previously pointed out, the master has to evaluate whether and how it is possible to provide assistance to people in distress at sea in the light of the existing circumstances. His/her decision-making power is an essential part of the international legal mechanism designed for saving life at sea.

Unlike traditional ships, MASS are able to navigate without a master on board; their command is delegated to a remote operator, who controls and/or supervises the activity of navigation directly from shore. This disruptive change in the traditional paradigm of navigation makes hard to understand if the use of MASS falls within the case described by the duty to assist people at sea, as codified by the mentioned international treaties. More precisely, it is not clear if the innovative figure of the remote operator can be analogously considered as the master of MASS or not⁴⁷.

Generally, while the term “master” is not defined in any international convention, International Law is replete of rules describing its duties and responsibilities. These provisions are based on the tacit understanding that the master is the person in command of

⁴⁴ In article 1(b), the term “vessel” is defined as: “[...] any ship or craft, or any structure capable of navigation”. According to this provision, there is no reason not to include MASS within the conventional meaning of “vessel”.

⁴⁵ Particularly, States which expressly adopt this position are Canada, Denmark, Finland, France, Germany, Italy, Singapore, Spain, United States, Argentina, Croatia and Panama. For more information on the survey realized by the CMI, visit <https://comitemaritime.org/work/mass/>.

⁴⁶ As noted in p. 6 of the present paper, this does not mean that there is not an international duty of assistance over masters of ships. However, this work is limited to study the international obligation over flag States.

⁴⁷ This issue has many implications, since all international rules on navigation deals with the figure of the master. For a general reflection on this matter, see BAUGHEN S., *Who is the master now?*, cit., 136.

the ship. Such position is supported by scholars, according to whom the master is the “natural person who is responsible for a vessel and all things and persons in it and is responsible for enforcing the maritime laws of the flag state” (emphasis added)⁴⁸. Indeed, although common experience conceives the master as a person necessarily on board the ship, from a mere legal perspective, the only essential element characterizing him/her is the position of command over the activity of navigation, independently of his/her geographical location⁴⁹.

With specific regard to the case at stake, the absence of a master on board does not preclude the application of the duty to assist people at sea to the use of MASS. Where the remote operator is able to fulfill the decision-making task required by International Law, he/she can be legitimately considered as the master of the ship for the purposes of the provision under study. Moreover, this logical conclusion is confirmed even more by a literal interpretation of the conventional rules analyzed before. Indeed, none of them explicitly requires the presence of a master on board; they simply prescribe that there must be a person able to intervene, where possible, to assist people in distress at sea⁵⁰. Nowadays, due to the technology of automation and control, such role can be adequately exercised from shore by remote operators.

b. The week level of assistance concretely provided by MASS: is it enough to comply with the duty to render assistance?

Once ascertained that the mere absence of a master on board does not compromise per se the applicability of the duty under study to the use of MASS, a further - and more critical - issue needs to be addressed: the incapability of almost all of the existing unmanned ships to provide high levels of assistance to people in distress at sea.

⁴⁸ CARTNER J.; FISKE, R.; LEITER T., *The International Law of the Shipmaster*, London, (2009), 86. A similar definition is adopted by U.K. domestic law. Indeed, according to the Merchant Shipping Act 1995, the figure of the master is defined as the individual in "command or charge of a ship".

⁴⁹ BAUGHEN S., *Who is the master now?*, cit., 131; PETRINOVIĆA R.; MANDIĆA N.; SIRIŠČEVIĆ E., *The Importance of Maritime Law in Seafarer Training Pursuant to Amendments to the STCW Convention*, Transaction on Maritime Science, (2016), 53.

⁵⁰ The analogical application of the duties of traditional master to the remote operator is explicitly adopted by Maritime UK, *Maritime Autonomous Surface Ships UK Code of Practice*, 2019, 21: “For the purposes of this Code, the term “master” should mean a specific person officially designated by the owner of the MASS as discharging the responsibilities of the Master of the MASS. This will be an employee of the company who has been assessed as competent to discharge these responsibilities in accordance with the provisions of this Code. This person may be located anywhere provided that the required level of command, control and communication can be maintained to discharge these duties”.

It is quite intuitive that, without human hands, ships are more limited in conducting assistance operations rather than manned ships. Moreover, due to their unmanned nature, MASS' design usually differs from the traditional one, because of the absence of facilities conceived for human accommodation⁵¹. As a consequence, these new means of maritime transport are not usually able to host people on board; since the moment of their construction, MASS' role in assisting people at sea is limited. Undoubtedly, remote operators can always guarantee certain (low) levels of assistance, such as launching S.O.S. signals or marking the location of people at sea; however, they usually cannot rescue and host persons on board, for the very reason that MASS are not projected for carrying out such activities.

These factual considerations give rise to another question, namely whether such (pre)determined delimitation in assisting people in distress at sea complies with the international duty under study.

According to some States, the answer to this puzzle is affirmative⁵². Their position is based on two different grounds.

As far as the first ground is concerned, since the activity of "assistance" required by the law is characterized by its flexibility⁵³, "The MASS's technical capabilities will define the nature and the requirements of the duty and not vice versa"⁵⁴. According to this statement, even if MASS are technically limited in providing full assistance, flag States are still complying with the international duty, because this rule merely imposes to configure the maximum level of assistance achievable in the light of the existing circumstances. From this side, the incapability of MASS to rescue and embark people on board does not constitute a violation of the international duty under study: this is just one of the circumstances to take into account in order to understand what "assistance" means with regard to MASS. In fact, according to International Law *de iure condito*, this duty does not always consist of rescuing activities⁵⁵. Coherently, with regard to unmanned ships, the duty to assist people at sea

⁵¹ It is important to specify that this does not mean that MASS cannot be *necessarily* constructed without human facilities on board. Of course this is possible. However, observing the first MASS projected in these years, they are usually conceived not to host persons on board. Moreover, it has to be remembered that the analysis of this paper is limited with regard to unmanned cargo ships, and not to unmanned cruises, which clearly are designed for host passengers on board.

⁵² Their position was expressed in the survey realized by the CMI mentioned before (note 45). For more information, visit <https://comitemaritime.org/work/mass/>.

⁵³ See p. 7 of the present paper.

⁵⁴ Maritime UK, *Maritime Autonomous Surface Ships UK Code of Practice*, 2019, 99.

⁵⁵ BAUGHEN S., *Who is the master now?*, cit., 136; SEVERANCE A., *The Duty to Render Assistance in the Satellite Age*, cit., 387.

would limitedly require masters to “make best endeavours to inform the appropriate search and rescue authorities”⁵⁶.

In any case, even if this position should not be considered legitimate under Public International Law - and therefore the concrete assistance provided by MASS should not reach the minimum level required - some States have observed that MASS condition is still not illicit, since it can be easily configured as a legitimate exception to the duty to render assistance⁵⁷. The second ground to justify MASS incapability in rescuing people is based on the assumption that International Law excludes the mandatory nature of the duty when assistance would be “unable”, “unreasonable” or “unnecessary”⁵⁸. More precisely, in that view MASS have to be considered “unable” to assist people at sea due to their unmanned nature; this technical feature would legitimately preclude the operability of the duty with respect to MASS.

Bearing in mind the abovementioned positions, it is interesting to observe that both of them find their justification on the flexible nature of the duty to assist people at sea. According to them, this flexibility imposes to firstly take into account the concrete capabilities of the assisting ship, and, only subsequently, to determine if assistance activities can be requested by International Law and what level of intensity they have to reach.

However, in our view, these positions are not entirely convincing.

It is indisputable that the duty under study has a flexible nature. This normative feature poses the master in the best possible condition for fulfilling his/her decision-making power, which, of course, must be exercised in the light of all the existing circumstances. Indeed, the duty under study needs to be general and flexible enough to adapt itself to the specific cases, which strongly differ from each other. However, what is absolutely not clear is whether such flexibility allows flag States to register ships (MASS) unable to rescue and embark persons in distress at sea.

⁵⁶ Maritime UK, Maritime Autonomous Surface Ships UK Code of Practice, 2019, 99. In addition to the United Kingdom, a similar position is adopted by Germany and United States during the survey realized by the CMI. Visit <https://comitemaritime.org/work/mass/>. Moreover, Finland affirmed that: “Regardless of the application of this regulation, a MASS may be required to engage in rescue operations other than recovery of persons from water, and these operations would be considered as giving assistance to those in distress at sea” (IMO, MSC/5, *Regulatory Scoping Exercise on the use of Maritime Autonomous Surface Ships (MASS)*, Report of the Correspondence Group on MASS, Submitted by Finland, 28 September 2018, 21).

⁵⁷ This view is less supported by States rather than the first one. In the survey realized by the CMI, Malta stated that: “It is our view that that the lack of crew on board can indeed be invoked to excuse an unmanned ship from failing to provide assistance to persons in distress”.

⁵⁸ See p.7 of the present paper.

As observed before, Public International Law obliges States to make sure that masters assist people in distress at sea by doing everything possible within the capabilities and limitations of the ship. Of course, assistance has a flexible meaning. Due to such flexibility, it is not possible to require masters to concretely endanger the ship for realizing “unreasonable”, “unnecessary” and “unable” operations. However, even if MASS’ masters are not responsible for having not rescued persons in distress at sea, this does not mean that the same conclusion is still valid with regard to flag States. Indeed, it could be argued that States, admitting the use of MASS, are concretely precluding their masters to render a “sufficient” assistance at sea; in doing so, flag States are a priori delimiting the margin of intervention of their masters when dealing with life or death situations. This decision seems to be contrary to the rationale of the duty under study⁵⁹, which is to guarantee the highest possible levels of assistance to persons in distress at sea.

In other words, the advent of automation and control technologies in the maritime field poses on States the legal and ethical dilemma whether approving or not an effective delimitation in the level of assistance provided by ships flying their flag. In our view, this unexplored issue cannot be solved by simply referring to the flexible nature of the duty to render assistance at sea, because such flexibility focuses on masters’ specific decisions in assisting activities, and not States’ behaviours in compliance to the analyzed international obligation.

5. When assistance of people is defined by economic perspectives: some critical thoughts on the use of MASS

The sea has always been an inhospitable environment for human lives⁶⁰. Navigation is studded with so many risks that, in a certain way, characterize and define it⁶¹. From this perspective, International Law strengthens even more the mandatory force of the natural obligation to assist persons in distress at sea.

However, as deeply observed during this work, the rise of automation and control technologies in the maritime field seriously challenges the concrete functioning of the

⁵⁹ According to article 31,1 of the Vienna Convention on the Law of Treaties, international written rules have to be interpreted *in good faith*. In our view, an interpretation which allows States to intensively delimit the level of assistance provided by masters seems not coherent with this requirement.

⁶⁰ PAPANICOLOPULU I., *International Law and the Protection of People at Sea*, 25.

⁶¹ For a very attractive lecture on the multiple risks related to the conduction of human activities at sea, read URBINA I., *The Outlaw Ocean: Journeys Across the Last Untamed Frontier*, New York, 2019.

international rules protecting human life at sea. In these last pages it is intended to report some conclusive considerations on how MASS challenges this fundamental obligation, also by addressing the relevance of economic interests in the definition of the level of assistance required by law.

It is quite intuitive that the use of unmanned ships can partially improve maritime safety. Indeed, the less persons are directly involved in the physical activity of navigation, the less risks there are for their life. However, at the same time, the less persons are crossing the sea, the less persons in distress can be saved. In our view, the delicate balance between these two elements is one of the most important issues which has to be faced by International Law of the Sea in the near future. In fact, while the use of MASS is extremely limited today, it will surely increase in the next years. At the same time, this does not mean that the need of assistance at sea will be reduced. Indeed, there is no sign that the migratory emergencies characterizing these years are consistently decreasing. Generally, maritime manned activities will continue to exist and so also the typical risks related to them. The international community has to start dealing with this problem, since it is not unrealistic to predict that such a mere theoretical question would soon become a concrete issue.

From this perspective, it is important to specify a further critical reflection: economic interests cannot determine the achievement of the equilibrium between the use of MASS and the delimitation of assistance deriving from it.

As previously pointed out, the technological innovation brought by MASS offers big opportunities for the shipping industry, which aims to maximise its profits from transport of goods at sea⁶². This (legitimate) economic interest is driving public and private players to increase the development and the production of MASS. In synthesis, it is the economical perspective which poses the question of the legality of ships unable to rescue people on board. This situation is dangerous and must be observed cautiously.

As analysed before, the flexible understanding of “assistance” at sea must be independent from commercial and economic considerations⁶³. Traditionally, this has always meant that the master’s discretion in evaluating which assisting operations must be carried out could not take into account the economic consequences deriving from. Delays in commercial trading are not relevant when dealing with saving life of people in distress at sea.

⁶² See note 6 of the present paper.

⁶³ See note 38 of the present paper.

With specific regard to MASS, economic interests sneakily define their capabilities to assist people at sea since the very moment of their construction. In other words, the delimitation of the concrete capabilities of the ship to rescue and embark persons in distress are a priori established by economic reasons.

In our view, this is the most critical concern raised from the use of MASS. The delicate equilibrium between the use of unmanned ships and the reduction of assistance levels cannot be founded on mere economic perspectives. Otherwise, it would be hard to accept this technological development both from an ethical and juridical point of view, because it maximizes profits minimizing human lives' protection.

Due to the novelty of this topic, in the absence of relevant States practice, the discussion is widely open. However, from a *de iure condendo* perspective, one solution could be advanced: in order to comply with the duty of assistance at sea with regard to the growing use of MASS, flag State have to make sure that unmanned ships have to be equipped with ways of recovery at sea and facilities to ensure the protection of rescued people on board⁶⁴. More precisely, MASS shall be able to rescue and host people in distress at sea, independently of their unmanned nature. This realistic⁶⁵ solution looks adequately balanced. Indeed, on one hand, it does not prohibit per se the construction and use of unmanned ships; on the other hand, it guarantees the same level of assistance traditionally provided by manned ships. Moreover, since nowadays the production of MASS is still limited, the imposition of design requirements for the future construction of unmanned ships seems effective and, at the same time, not excessively harmful to (legitimate) economic interests of business players in this field. Conclusively, and more importantly, the adoption of this proposal could prevent that the main novelty brought by MASS would be an odious paradox: the more technology develops, the less life of people at sea is protected.

⁶⁴ This position has been promoted by the Republic of France, which, in answering to the survey of the CMI, affirmed: "Unmanned ships should therefore only be authorized to sail if they are technically able to provide assistance [...]. That means unmanned ships must be equipped with ways of recovery at sea, and ways to ensure the protection of rescued persons aboard (cabins, food, etc.)". For more information, visit the online website <https://comitemaritime.org/work/mass/>.

⁶⁵ The proposed solution is can be concretely realized from a technical point of view. In fact, many projects highlighted how automation technology can perform basic operations of assistance to people in distress at sea, such as temporarily rescuing them. Just to provide a concrete example, it must be highlighted the European project "ICARUS", which specifically deals with the implementation of technology of automation in the field of rescuing people at sea. For more information, visit the website <http://www.fp7-icarus.eu/>.