

NEW TECHNOLOGIES, ARTIFICIAL INTELLIGENCE, INTERNATIONAL MARITIME LAW AND FUNDAMENTAL RIGHTS

Jorge Isaac Torres Manrique*

Abstract: *New technologies and artificial intelligence register an important presence and contribution to humanity. However, it is necessary to determine the relationship between them and international maritime law, as well as fundamental rights. In this installment, the author is responsible for developing and demonstrating the transversality between fundamental rights and them. That is, the approach to their legal and extra-legal interrelation.*

Keywords: *Artificial intelligence, New technologies, Fundamental rights, International Maritime Law*

I. INTRODUCTION

As a first point, it is to be considered that autonomous emerging technologies have been presenting a marked development in the maritime sector and in its more specific derivatives and various modalities.¹

International shipping accounts for approximately 80% of global freight transport between peoples and communities around the world. Maritime transport is the most efficient and profitable international transport system for most goods; It constitutes a safe and low-cost means of international freight transport, which promotes trade between nations and peoples, while contributing to their prosperity. The world depends on a safe, secure and efficient international shipping industry, which is achieved through the regulatory framework that is established and kept up to date within the IMO (International Maritime Organization, a specialized agency of the United Nations responsible for safety and security of navigation and to prevent pollution of the sea by ships).² It should be noted that in this paper we deal *stricto sensu* with maritime shipping for freight and fishing. So, both military navigation and recreational navigation are left out of it. On the other hand, it is to be considered that just as *latu sensu* that maritime navigation generates

undeniable benefits to humanity, it is not exempt from risks. Likewise, the irruption of new technologies in the aforementioned company is not new.

It is important to note that the influence of new technologies fosters a new scenario, consequently, we analyze the fundamental rights that are involved and to the respective extent. Likewise, we record that in this installment we will address international maritime law, in light of its three component legal branches, which are indicated later.

II. ABOUT INTERNATIONAL MARITIME LAW

International maritime law encompasses a broad and complex extension of public international law, comprising different disciplines such as the law of the sea, maritime law and the law of navigation. So we have:³ i) Law of the sea- According to Alberto Szekely, he affirms that it is the branch of public international law whose norms regulate the conduct mainly of the States in the marine sphere, which is divided into three types of zones: first, the marine zones subject to the national jurisdiction of the States, that is to say the territorial sea, the internal marine waters, the contiguous zone, the exclusive economic

* Doctorates in Law and Administration, from UNFV (Lima). The author can be reached at kimblellmen@outlook.com

¹ Pérez Fernández, Jeannette. *Drones, tecnología autónoma en la navegación marítima*, En línea: Recuperado en fecha 1/1/22 de <https://www.mascontainer.com/drones-tecnologia-autonoma-en-la-navegacion-maritima/>. Valparaíso. 2020.

² Organización Marítima Internacional. *Introducción a la OMI*. En línea: Recuperado en fecha 1/1/22 de <http://www.imo.org/es/About/Paginas/Default.aspx>. Londres.

³ Velázquez Elizarrarás, Juan Carlos. *Tres vertientes del derecho internacional marítimo: derecho del mar, marítimo y de la navegación y su recepción en el orden jurídico de México, un Estado "bioceánico"*. En línea: Recuperado en fecha 1/1/22 de <http://www.scielo.org.mx/pdf/amdi/v15/v15a22.pdf>. Ciudad de México. 2015, pp. 818, 827, 829.

zone and the continental and insular platform; secondly, the high seas, which are beyond the aforementioned areas, and where the states enjoy the freedom of navigation, fishing, overflight and the laying of submarine cables and pipelines; finally, the area of the seabed and ocean floor beyond the limits of national jurisdiction which, together with the resources found therein, are the common heritage of humanity. ii) Maritime law- Enríquez Rosas points out that it is a set of principles, institutions and legal norms that regulate the subjects, objects, facts, acts and relationships derived from human activities of use of the sea, recognized by current international treaties on the law of the sea; set this one that according to each internal law extends—to be expanded or reduced—to the waters of state jurisdiction. iii) Right of navigation- Osvaldo Blas Simone specifies that it is the set of legal rules (norms and principles) that regulate the subjects, goods and legal relationships derived from navigation or on the occasion of it, whatever the means, place or purpose that is carried out. and that enable its effective realization.

In sum, Enríquez Rosas notes that: i) the law of the sea regulates marine spaces and recognizes the human freedoms to be exercised at sea; ii) maritime law, regulates in a generic and contextual way the exercise of such freedoms, and iii) navigation law, systematizes in particular the study of navigation by water, as one of said freedoms.⁴

In accordance with the above, we have international maritime law, encompasses the triad: law of the sea, maritime law and navigation law. However, this does not prevent their approach from being carried out indistinctly, separately. On the other hand, specify that the law of the sea seems to include both maritime law and navigation law, assuming them as a kind of subspecies.

In this order of intelligence, we consider that the relationship between them would be: I. International maritime law, as a genre, 1a) Law of the sea, as a species, and 1ab) Maritime and navigation rights, as a subspecies.

III. ABOUT NEW TECHNOLOGIES AT SEA -

1. Advanced technology-

i) Drones- From the air they can capture amazing images, being used to survey fishing reefs from above, inspect dams and examine port infrastructure.

ii) Autonomous ships- Its construction is beginning, promoting one of the most advanced technological systems, which are expected to operate without a crew.

iii) *I Bubble*- It is an underwater drone. What is innovative is that it does not use the traditional cable and therefore its versatility in the water is greater, in case of detecting a problem it is possible to connect an optional cable to send the material live to the surface.⁵

2. Internet of Things- It is the network of interconnected devices equipped with a unique identification in the form of an IP address with integrated or external technologies that allow them to capture and collect data and transmit information about the environment in which they are located or about themselves. Applications include programs that use satellite-generated data to determine the best route and calculate the time of ship arrival in real time, and new smart containers that use sensors and telematics equipment to record temperature, vibration, humidity and air quality during sea transport, as well as to control reefer ships, improve ship-shore connectivity and for intelligent traffic management. Also, the blockchain technology that has the necessary capacity to improve the security of the Internet environment of things.⁶

3. Additional Cases- We have the VHF Data Exchange System (VDES) and the Global Maritime Distress and Safety System (GMDSS), where the development of the first standard, together with the modernization of the second, represent a great advance within this sector. This, despite the fact that technologies related to communication systems for the maritime environment have not stopped evolving since their appearance. Therefore, it is logical to ask about the future of maritime communications for navigation, safety and protection of the marine environment. On a large scale, with e-Navigation comes the desire to achieve total interconnection between ships and coastal stations through radio links with the aim of guaranteeing safe navigation; as well as providing the crew and coastal authorities with relevant information in real time.⁷

⁴ *Id at.* p. 829.

⁵ *Supra* note 1.

⁶ Conferencia De Las Naciones Unidas Sobre Comercio Y Desarrollo. *Informe sobre el transporte marítimo 2018*. En línea: Recuperado en fecha 1/1/22 de

https://unctad.org/es/system/files/official-document/rmt2018_es.pdf. Geneva, 2018, pp. 95- 96.

⁷ Gradiant. *La digitalización de las comunicaciones marítimas. Estudio de la evolución de las comunicaciones marítimas: desde la voz hasta la e-Navigation*. En línea: Recuperado en fecha 1/1/22

Societies face a vertiginous development of technologies and its direct impact on international maritime law, transforming international maritime relations, where the oil and mineral exploitation of the continental shelf and the seabed and ocean floor stands out.⁸ In this regard, the evolution of new technologies in maritime navigation is undeniable and plausible. They enhance it in terms of efficiency and effectiveness. In addition, it is to apostrophize the marked tendency to seek not only the unbeatable complement, but what seems to point most is to the replacement, displacement, postponement of the machine over the human. In this sense, it is worth analyzing the advantages and disadvantages, since, on purpose in principle, the incursion of new technologies could end up distorting international maritime law.

IV. RISKS

It should be noted that companies need to hire specialized people and in the face of the impact of external threats, they must maintain a good risk management system to avoid possible cyber damage, they also need to maintain controls on computer systems that allow them to achieve cyber security in their operations, which translates into increased operating costs that not all companies can afford. The new risks to which navigation and maritime transport are exposed need a different or special treatment, at the same time new capacities and technical experience are required to deal with Cybersecurity problems, which grow on the list of priorities for maritime companies and There is no single way of how to solve and apply cybersecurity to incidents that arise.⁹

So, we have ships that will be able to navigate alone, without a crew, intelligent systems that make it possible to control autonomous navigation, data centers and artificial intelligence, sensors in containers that alert about problems with on-board storage temperatures and even a virtual captain. These are some of the technologies that are being developed. All these emerging technologies that include drones, blockchain, sensors, autonomous ships and other more specific ones such as artificial intelligence, the Internet of

things, among others, their introduction and implementation is undoubtedly a great challenge for the navigation and maritime transport, something that shows that we are breaking the paradigm since the digital transformation does not stop, they make our lives easier and they are here to stay.¹⁰

In addition, it is pointed out that the shipowner will be able to reduce human errors (which are the main statistical cause of maritime accidents, thus theoretically reducing insurance premiums), reduce the production of waste on board, save costs in maritime crew and suppress the qualification of the same on board, thus gaining cargo space. On balance, autonomous navigation may not be safer or more profitable in the short/medium term. It therefore appears that there are reasons for shipowners and their insurers to take a reasonably conservative approach to this phenomenon.¹¹

Likewise, the 2017 Maritime Transport Report cites several examples of cyberattacks and vulnerabilities in navigation systems and other naval and port systems, such as interference with automatic information systems and electronic chart display and information systems, jamming GPS systems, and tampering with cargo systems and other ship and port systems, including by introducing malware, hijacker programs, and viruses. In particular, 2017 was marked by several global cyberattacks using hijackers or other programs, demonstrating that while such attacks have not so far targeted shipping on a widespread basis, they can have serious consequences. These events along with several massive GPS spoofing attacks against multiple ships in the Black Sea underscore the importance of cyber risk management and cyber security. There have also been cases of cyber-attacks combined with conventional hacking, in which hackers seem to have managed to identify ships with valuable cargo and minimal security on board by infiltrating shipping company systems.¹²

To date, no binding international regulations on cybersecurity have been adopted for the maritime sector. However, the IMO Maritime Cyber Risk Management Guidelines provide high-level recommendations to protect shipping from existing and emerging cyber threats and to

[dehttps://www.cellnextelecom.com/content/uploads/2019/12/La_digitalizaci%C3%B3n_de_las_comunicaciones_maritimas_1raEd_ES.pdf](https://www.cellnextelecom.com/content/uploads/2019/12/La_digitalizaci%C3%B3n_de_las_comunicaciones_maritimas_1raEd_ES.pdf). Vigo, 2019, p. 94.

⁸ Supra note 3 at p. 852.

⁹ Supra note 1.

¹⁰ Ibid.

¹¹ González Pellicer, José Manuel y Delagrange, Olivia. *Rumbo al derecho de la navegación marítima automatizada*.

En línea: Recuperado en fecha 1/1/22 [dehttps://www.kennedyslaw.com/media/3293/heading-for-automated-maritime-navigation-law_spanish.pdf](https://www.kennedyslaw.com/media/3293/heading-for-automated-maritime-navigation-law_spanish.pdf). Londres, 2018, p. 7.

¹² Conferencia De Las Naciones Unidas Sobre Comercio Y Desarrollo. Ob. Cit. P. 93.

reduce related vulnerabilities (IMO, 2017a). The Guidelines contain five functional elements for effective risk management in the maritime sector, namely identify, protect, detect, respond and recover (IMO, 2017b). To be effective, these elements must be incorporated into all aspects of shipping companies' operations and personnel management, just as the industry has integrated safety culture with the adoption of the International Safety Management Code and the implementation of security management systems.¹³

On the other hand, maritime transport is one of the most dangerous occupations in the world, and already has innumerable associated risks that, although technology has improved the expectations of avoiding them, nature and sea conditions can continue to influence the ups and downs of the navigation, as well as fire as the greatest risk factor on board and the different events such as arrival, grounding, collisions, water ingress, are among others some of the many risks that a ship has to navigate. Although it is true that the number of accidents on board has been decreasing over the years thanks to the efforts of the International Maritime Organization (IMO), in 2016 there were 2,6112 accidents, without considering the 246 attacks by pirates and armed robberies against ships. merchants.¹⁴

The IMO guidelines present functional elements that support cyber risk management and are defined as follows: i) Identify: to define the roles and responsibilities of personnel for cyber risk management and identify the systems, assets, data and capabilities that, when disrupted, pose risks to ship operations, ii) Protect: implement risk control processes and measures, and contingency planning to protect against a cyber event and ensure continuity of shipping operations, iii) Detect: Develop and implement activities necessary to detect a cyber event in a timely manner, iv) Respond: Develop and implement activities and plans to provide resiliency and restore systems necessary for shipping operations or services impaired due to a cyber event, v) Recovery: Identify measures to back up and restore cyber systems necessary for shipping operations affected by a cyber event.¹⁵ Technology brings risks that have been little valued until now that must be taken into account in all risk analyses, because failure to do

so can cause not only commercial and civil problems, but also public order problems due to the amount of information and merchandise that moves in transport. maritime. The flag states must take sufficient measures so that in ports and ships parameters are given that minimize risks for strategic infrastructure such as ports and maritime transport. Maritime navigation insurance should be pressured so that, among its estimates, the contractual conditions of claims due to cyber risks caused by cyber attacks are improved. The subjects involved in the maritime business must ensure that computer systems and procedures are treated as navigation risks, even affecting the state of navigability since the ship is left without a response to an attack of this type, this inclusion would facilitate the coverage of risks given by insurers and protection clubs.¹⁶

In this regard, it should be noted that although it is true that they are capital issues, risk management, the budget issue involved, cyber attacks, human errors and the gradual transfer of direct management of marine vessels by new technologies and artificial intelligence; likewise, in the issue related to the risks of new technologies in maritime navigation, this quality constitutes the strict priority guarantee of protection and safeguarding, both of human life that still remains in marine vessels, and the preservation and no predation of marine species.

The latter is referred to the special concern that the promotion of maritime fishing with the assistance of new technologies must generate, since, in this extreme, sustainable development must also be considered as a basic factor.

V. AUTOMATION LEVEL

In this regard we have as such; manual, manned and assisted: i) Manual. Many current ships navigate manually with crews assisted on board by automatic devices, ii) Automated by Remote Control, whether manned or not. The next step is to ensure that, depending on the need, a manual navigation ship can change it to "remote control" and vice versa, in which case it will need to be minimally manned. There may also be unmanned ships operated exclusively by remote control (in which case, the crew on board would be supplied by the crew on land — or on another ship—), and iii) Autonomous. Whether manned or not. The extreme point in

¹³ Ibid.

¹⁴ Chávez Perdomo, Luis Eduardo. *Nuevas tecnologías, riesgos cibernéticos en la navegación acuática*. En línea: Recuperado en fecha 1/1/22 de [https://alsum.co/nuevas-](https://alsum.co/nuevas-tecnologias-riesgos-ciberneticos-en-la-navegacion-acuatica/)

[tecnologias-riesgos-ciberneticos-en-la-navegacion-acuatica/](https://alsum.co/nuevas-tecnologias-riesgos-ciberneticos-en-la-navegacion-acuatica/). Bogotá, 2020.

¹⁵ Ibid.

¹⁶ Ibid.

the path of automation is called autonomous navigation, where the ship makes its own decisions through an algorithmic artificial intelligence system (without prejudice to the fact that it may be equipped with a minimum security crew).¹⁷

VI. AUTOMATED, AUTONOMOUS AND UNMANNED VESSELS

It is necessary to carry out the differences between them, thus we have: i) Automated ship, As a general concept, it includes all those ships whose operation has been totally or partially automated (three levels indicated above), ii) Autonomous ship. As a specific concept to define the fully automated vessel (third level), and iii) Vessel without crew. As a unique concept that encompasses all those automated ships without crew on board.¹⁸

VII. GUIDING PRINCIPLES OF AUTOMATED MARITIME NAVIGATION

In this regard, it is necessary to see: i) Transfer of Control: Automated maritime navigation seeks to transfer control of the ship. Thus, when we talk about remote control navigation, this transfer occurs to the detriment of the on-board crew and in favor of the ground crew. Whereas, when we refer to autonomous navigation, the transfer occurs from man to machine, ii) Security Equivalence: The transfer of control will be conditioned by security reasons, and it must then be proven that automated browsing is at least as safe as the manual browsing that it intends to replace, iii) User Expectation: The shipping company itself expects autonomous ships to be generally safer than manual ones, iv) Profitability: The weighting of the real cost savings that the change in favor of automation entails.¹⁹

VIII. AN AUTOMATIC LAW OF THE SEA

The technical-legal transition towards automated navigation will be very gradual. If the leap from on-board human control to remote human control is already delicate, imagine the jump towards a ship that protects itself. And it is that dispensing with human control on board has a direct impact on Maritime Law. In

principle, it is clear that without international regulatory uniformity (which must be promoted by the International Maritime Organization) automated navigation will founder without remedy. The main disruptive factor for the current regulations of automated navigation is given by the well-deserved principle of transfer of control, leadership or command of the ship; Therefore, the current regulations do not conceive of a vessel other than the manned one and, for safety reasons (until the contrary is proven), they do not admit the aforementioned transfer of command either to a remote crew or to a machine (no matter how “intelligent” it pretends to be).²⁰

Under this anthropocentric premise, unmanned remote-controlled vessels or autonomous vessels would have: i) Prohibited or conditioned their entry, visit or stay in Spanish ports, ii) Prohibited or conditioned their right to navigate in national maritime spaces or their innocent passage by the territorial sea, being treated in a way not very different from nuclear-powered ships or those that transport radioactive and dangerous substances, iii) Unmanned ships could not provide effective assistance to people in danger at sea, nor report on the existence of stowaways on board or provide them with the maintenance, lodging and legally required medical assistance, iv) A more lax labor regulation that allows the hiring of seafarers at low cost, v) In sales it is possible to speculate with a virtual delivery consisting of mere codes of remote access to the ship's operating system (whether remote-controlled or autonomous), vi) The digitalization of the and the official certificates of the ship, vii) The logbooks, Engine or Logbooks must also be completed remotely, vii) The safety and classification of automated ships could be the subject of a regulatory avalanche aimed at guaranteeing that equivalence (by virtue of the Security Equivalence Principle).²¹

In short, under the current regulatory framework, unmanned automated vessels would be easy target of the sanctioning regime provided for by the Spanish Ports Law, for example. Today, they would be illegal, unsafe, unseaworthy, uninsurable and unsaleable vessels. Will this slow down technical evolution? Yes. Will it stop her, no.²²

In this regard, it is necessary to state that the law of the sea regulates marine spaces and recognizes the human freedoms to be exercised

¹⁷ Supra note 11 at p. 3.

¹⁸ Id at p. 4.

¹⁹ Id at p. 6- 7.

²⁰ Id at p. 7.

²¹ Id at p. 7- 8.

²² Id at p. 10.

at sea. This, in the understanding that new technologies are experiencing uncontrollable development in favor of maritime navigation. For its part, the Law is constituted as a shadow that follows reality to regulate it in accordance with the changes it experiences. Consequently, the law of the sea cannot be alien or foreign to the quintessence of Law, that is, to facilitate and guarantee the coexistence of human beings in society. In this sense, the law of the sea must tune in and harmonize with new technologies, due to its role as regulator of marine spaces and recognizes the human freedoms to be exercised in the sea and from the role as Law to precisely make said role is in accordance with the new realities and requirements to guarantee the protection and safeguarding of rights and freedoms in marine navigation with a marked tendency towards new technologies.

IX. ANALYSIS FROM FUNDAMENTAL RIGHTS

In this section we find ourselves in the third block that embraces this work, that is, the approach from constitutionality, specifically from the perspective of fundamental rights.

For these purposes, it is to be considered on the one hand that although it is true that the existing synergy between merchant maritime navigation and new technologies becomes important and profitable (because it generates development and well-being for the peoples of the world); At the other extreme, it is of utmost importance to keep in mind that the achievements and conquests in the aforementioned venues cannot be determined as legitimate, as long as they cross the line of fairness.

And it is that, the explanation goes through the priority and supremacy of its value and attention. Ergo, the creation of super cyborg maritime ships would be worth nothing, if the percentage of risk equals or exceeds those caused by man.

On the other hand, it is important to consider that accidents also involve very serious marine pollution by accidentally spilling fuels or chemicals in their different variants.

In this sense, it is necessary to specify that among the fundamental rights that must be protected and safeguarded in said task, we have:

i) to life, ii) to health, iii) to a healthy and healthy environment, iv) to integrity physical.

X. CONCLUSION

The fullness and consolidation of new technologies in maritime navigation is presented as a very auspicious and irrepressible alternative for the development of the same, international maritime law and peoples.

However, to the extent that the majority of accidents on board correspond to human reasons, a capital challenge must be assumed. That is, to ensure that new technologies in maritime navigation guarantee the dramatic decrease in human deaths in accidents and even in their eradication. This, in protection and safeguarding of the unrestricted fundamental right par excellence, which is, human life.

On the other hand, it is worth bringing up the precautionary principle in order to embrace a sustainable fishing policy, which safeguards the ecosystem of the sea and, in turn, the unrestricted fundamental right to a healthy and healthy environment.

The use of new technologies in maritime navigation reduces transaction costs (ie time, money and effort).

Law is not in tune with the situation indicated. This is of great concern, since instead of coming together it ends up becoming an obstacle.

The fundamental rights that must be protected and safeguarded in the alliance between maritime navigation and new technologies, we have: i) to life, ii) to health, iii) to a healthy and healthy environment, iv) to physical integrity.

XI. SUGGESTIONS

Dialogue between the actors of the creation of new technologies, maritime navigation, international maritime law, fundamental rights and constitutional law. This, in order to harmonize said confluence, take advantage of its benefits, reduce risks and safeguard the inalienable fundamental rights. Training and awareness to the actors of the topics corresponding to this work, with emphasis on the preponderance as observance of the unrestricted fundamental rights.