FRENCH REGULATIONS ON MASS: SOLVED AND UNSOLVED ISSUES

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I. INTRODUCTION

1. Maritime law is an ancient law, designed for ships that are armed and equipped, and for which seafarers are inseparable. Whether in terms of the semantics attributed to embarked personnel or those relating to navigation permits, maritime law was built on the principle of the presence of a crew on board a ship to face the inherent risks of the maritime expedition**.**

2. Arrival of MASS represents a technological and cultural metamorphosis. Technologically viable, autonomous unmanned vessels, are set to revolutionize the maritime sector. It must be said that maritime law has yet to grasp this major innovation.

3. To date, 4 types of autonomous vessels seem to stand out:

i. The vessel with automated processes and decision support: personnel on board the vessel operate and control on-board systems and functions, but some operations may also be automated.

ii. The remotely controlled vessel with on-board personnel: the vessel is controlled and operated from another location, but humans are still on board.

iii. The unmanned remote-controlled vessel: the vessel is controlled and operated from another location, with no human presence on board. Cameras, microphones and other sensors are used to transmit information to the driver. Although there is no there is no longer a crew, but a human being can still influence the ship's progress in real time.

iv. The fully autonomous ship: the ship's operating system is capable of making decisions and actions on its own. The autonomous vessel processes the data collected by its sensors, makes decisions about navigation and optimizes its response to traffic. Thanks to deep-learning technology, the autonomous vessel learns from its mistakes, acquires experience and improves its practice.

4. Necessity to define the legal scope of autonomous vessels in creating a special regime or in amending the provisions (of national regulations and international conventions) which exclude the operation of unmanned vessels so far, or do not cover the operation of unmanned vessels, since they apply exclusively to the operation of manned vessels, or ignore this issue, and to rethink some of traditional "concepts" of maritime law which seem to be not compatible with the autonomous ships so far.

5. In this perspective, France has become one of the first country to introduce the concept of autonomous ships (and also maritime drones) into its legal corpus.

Traditionally, French law referred to the crew with the term "equipped" in its corpus as ship was defined as *"a floating craft, equipped with a means of propulsion and able to face the perils of the sea."*

With the **Law No. 2016-816 of 20 June 2016** for the blue economy the article L 5511-1-1 of the French Transport Code and refers for the first time to the MASS as "*craft on which no person is embarked*":

> *"A floating surface or underwater craft, on which no person is embarked, operated from a vessel flying the French flag, must bear external identification markings defined by regulation."*

The Law of 24 December 2019 has incorporated a broad maritime section designed to improve the body of legislation both to implement new social and environmental rules and to anticipate the adaptation of the law to the digital revolutions.

With the article 135. III.1 of the law of 24 December 2019 : 5 objectives were set out and Government was empowered to legislate by Decree to enable the navigation of autonomous or remotely controlled vessel, define the conditions under which these new vessels can be used to preserve the safety of maritime navigation and the environment, specify the corresponding liability and insurance regime, as well as the labor and social laws applicable to the personnel concerned, and finally define the conditions under which failure to comply with these provisions will be investigated, monitored and punished.

The Decree of 13 October 2021 has authorized the navigation of fully autonomous or remotely controlled vessels with the creation of a specific experimental operating regime for these ships.

Indeed, this Decree authorizes these vessels to sail in French territorial waters, for a maximum period of two years while maintaining an overall level of safety and environmental protection (article L. 5241-3-1 of the French Transport Code) while

providing a legal definition of the autonomous vessels and a clear distinction between unmanned vessels and drones through technical characteristics (size, speed and power limits). Also, the Decree confirms that the master is "the person who commands these ships"

II. LEGAL ISSUES SOLVED WITH FRENCH REGULATIONS ON MASS :

The definition of autonomous vessels has been set and also the distinction between unmanned vessels and drones through technical characteristics (size, speed and power limits) **(1)**, and the command of the ships assuring through the figure of Master has been confirmed **(2).**

1. Legal and technical definition of MASS and distinction with the drones:

With the Decree, the definition of the MASS has been adapted to integrate the use of fully autonomous and remotely operated vessels:

Article L.5000-2-1 of the French Transport Code provides that:

> *"(…) an autonomous vessel is a vessel operated remotely or by its own operating systems, whether there are seafarers on board. The person in command of the autonomous vessel is the master."*

We can imagine that in addition to the usual ship identification criteria referred to in Article L5111-1 of French Transport Code which are the name of the vessel, the port, the nationality and the tonnage, some other elements such as for example the model of software used or the types of sensors, cameras could be elements of identification.
Also, a distinction with the drone has been made through technical characteristics (size, speed and power).

Therefore, on the basis of the elements provided by the article L.5000-2-2 of the French Transport Code (created by the Decree) which gives the definition of the drones and also on the basis of various consultations which were carried out, we can understand that:

> *"A maritime drone is a floating surface or underwater craft operated remotely or by its own operating systems. or by its own operating systems that meets the following cumulative conditions:*
>
> - *No personnel, passengers or cargo on board;*
> - *A gross tonnage of less than 100 UMS;*
> - *Its overall length is greater than 1 meter and less than 16 meters;*
> - *Its maximum speed is less than or equal to 20 knots;*
> - *Its kinetic energy is less than 300 kJ."*

Therefore, as soon as a maritime craft does not meet these criteria, it will be a MASS.

2. The command of the MASS:

2.1 As already mentioned by Professor G. PIETTE, with the digitalization of maritime sector and arrival of MASS *"the first master on board is no longer the captain, but the means of communication."*[1]

However, the Decree of 13 October 2021 confirms the institution of Master in stipulating that these autonomous ships remain under the command of the master, *i.e.* the person in charge of the maritime expedition – even if no human is on board:

- L.5000-2-1 of the French Transport Code states: *"(…) an autonomous vessel is a vessel operated remotely or by its own operating systems, whether there are seafarers on board. The person in command of the autonomous vessel is the master."*

- L. 5511-3-1 of the French Transport Code states that*: "When persons participating in the operation of an autonomous vessel, including the captain, are seafarers, they are deemed to be embarked within the meaning of this section";*

These provisions have removed the impossibility of exercising command from the land as seafarers were defined before this Decree as "*the persons on board a ship*" (article L.5511-1 of French Transport Code).

It would mean that the team responsible for pilotage from land could be defined as the crew and the chief as Master.

A very recent draft application Decree has been submitted by the Government following the session of February 2023 to amend the French Decree no. 84-810 related to the protection of human life at sea and pollution prevention, in which it is stated that the ship's "place of command" will necessarily have to be defined in order to provide for or extend certain obligations in terms of equipment and control of these areas, which are seen as a dismemberment of the ship's "shipboard". To date, it proposes amending the said Decree by using the term "remote control center", deemed more appropriate than "remote operation center", as it covers both remote operation and supervision functions.

[1] G. PIETTE, Droit maritime, Ed. 2017 Pedone

For the level 4 of MASS i-e ships operated and controlled by their own operating systems (with deep learning and AI) these new provisions do not give any clue to identify who could be the (last) person(s) in command of the autonomous vessel (technology supplier or the developer / programmer) and where can be this "command location"?

2.2 Master will not benefit from the prerogatives of public authority:

The Decree has created the article L. 5521-6 of Transport Code which provides that:

> *"Masters of autonomous vessels and their deputies do not benefit from the prerogatives of public authority."*

Traditionally, as Professor G. PIETTE stated that "*the ship is a microcosm of the state and so sovereign's powers must be represented*."

That is the reason why the Master used to assume the prerogatives of public authorities during the expedition by acting in the place of public officers in intervening as Civil registrar (he was competent for example, to draw up birth or death certificates), or as Public Notary by receiving the authentic wills.

He used also to have powers in matters of disciplinary and penal/criminal misconduct to maintain the safety and security of the ship (and of all the persons on board).

With the MASS, master is losing one of his prerogatives i-e public authority powers. But as Humans are becoming rare species on board, these specific prerogatives are no longer necessary.

III. LEGAL ISSUES UNSOLVED WITH THE FRENCH REGULATIONS ON MASS:

Finally, while the decree of 13 October 2021 provides some guidance for adapting French maritime law (or even International maritime law in the future) to the use of MASS), it raises more questions and uncertainties.

Indeed, the core of these questions remains the exact identification of the Master, and as developed above, it is not clear in the 4 types of MASS who will wear the master's hat.

This question is not purely academic as defining who the Master is, has direct consequences on the determination of his duties / functions **(1)**, and his liability **(2).**

1. Silence on the determination of the functions and liability of the MASS' Master:

- Duties and Functions:

The Master is traditionally referred to as "*the only master on board after God*" which corresponds to the combination of his several functions.

Indeed, the Master has various missions and represents the owner on board to execute operational and technical functions (for the safety, execution of the voyage, record keeping), employment/working functions, commercial functions, judicial functions…

In fact, the identification of the Master is fundamental especially regarding the environmental and safety issues:

Environmental issues: For example, the Montego Bay Convention recognizes a significant role for the Master in preventing and controlling pollution of the marine environment, by informing coastal states (art. 211). The BWM Convention, entrusts the master and his crew with the management of ballast water (Rules B-1, B-2 and B-6). [2]

Safety issues: Many provisions of international conventions focus on this issue. This is the case for the rules requiring a sufficient number of crew members (SOLAS, chapter V, regulation 14), and appropriate skills and qualifications (CMB, art. 2). qualifications (CMB, art. 94.4; ISM, art. 6; STCW) or master's powers, authority and responsibility in terms of safety and security. (ISM, art. 5; ISPS, art. 6 chap. XI-2, regulation 8) or obligations of assistance and salvage obligations (CMB, art. 98; SOLAS, chap. V, regulation 33; London Conv. London, art. 8 and 10.[3]

We can wonder how these functions will be adjusted to the MASS's Master as the French law remains silent on this point.

- Liability:

In the civil liability system, based on the notion of risk and correlatively on human intervention on ships, the human behavior plays a central role in the civil liability rules therefore most liabilities, in contract or in tort, are triggered by a human wrongful act or a negligence, a human breach of rules, or a human lack of due diligence.

In maritime law, shipowner can be responsible for his own negligence and for the negligence of his servants which traditionally includes the master and the crew.

But in this new landscape, where the captain is no longer what he used to be, where new players are involved and where, at the same time, human is disappearing in

[2] G. PIETTE, Droit Maritime, Ed. 2017, Pedone
[3] G. PIETTE, Droit Maritime, Ed. 2017, Pedone

favor of the machine, this will certainly lead to seek other types of negligence, new responsible players, and associated liabilities of a different nature.

For fully autonomous ships (level 4) which navigate independently of human real-time decision making and on the basis of programs, it is difficult to find room for an assessment of fault - unless the shipowner has failed to exercise due diligence in his operation and use of the autonomous ships or in relation to maintenance or software updates – which would probably lead to use strict liability scheme to cover these new issues.

Two liability systems could be considered in this context of disappearance of humans in favor of machines: liability for things (C. civ., art. 1242) or liability for defective products (C. civ., art. 1245 et seq.)

2. Silence on the traditional maritime concepts which rely on or involve master (and its crew) intervention?

Autonomous ships put on test many traditional maritime concepts which rely on or involve human intervention on board (Master and the crew) and the answers brought by French law do not give any clue to know how these concepts could be adapted (or perhaps discarded).

We can focus on 4 concepts:

- Limitation of liability

Shipowners have for long been entitled to limit their liability.

In the light of the 1976 Convention of London on Limitation of Liability for Maritime Claims, the question shall be whether the right to limit liability can be extended to the new actors (technology suppliers such as analysts and developers and programmers)?

It is reminded that under the LLMC Convention, the persons entitled to the limitation of liability are shipowners (such term covering the owners, charterers, managers and operators of the ship) but also « *a person for whose act, neglect or default the shipowner is responsible*[4] » (article 1).

As we understand from French law the unmanned vessel still has a master, the limitation would still be justified. There is therefore, in our view, no reason to deny limitation of liability to the owner of an unmanned vessel without crew

But if we consider that the equipment and system supplier /programmers monitor the navigation of ships and assume liability for such duties, they should be entitled to limit the liability as they perform a « *work function* » on behalf of the shipowner and could be regarded as his « servants »?

[4] Extension to crew and Master (even if in French law since Costedoat case law 2000 « servants » are protected from claimant actions)

- Nautical fault: exception in the carriage of goods

Under the Hague-Visby rules, the same would apply as all the circumstances provided to exclude the liability of the carrier would also exclude that of the master and of each servant of the carrier.

For example, the nautical fault, based on the article IV.2(a) of the Hague-Visby Rules provides that carrier nor ship shall be responsible for loss and damage to cargo resulting from *"act, neglect or default of the master, mariner, pilot or the servants of the carrier in the navigation or in the management of the ship"*.

With the new technologies and especially with the use of MASS, we can wonder if the fault committed in the "management" of the ship through the MASS shall fall within the scope of provisions of said rules.

However, it is important to remind that historically, the nautical fault exception was justified on the basis that shipowners lacked the ways to control their ships by communication on long voyages and so masters had to act in their own judgement.

I gather that this exemption already controversial could become even more irrelevant in the context of MASS under permanent communication and multiple actors (exception in the Rotterdam Rules has been abolished).

- Collision

The collision between sea-going and/or inland navigation vessels flying the flag of 2 different member states is a fault-based liability « by the fault of a vessel » (article 3 & 4 Convention 1910) which refers to:

> « *Human negligence* » as a minimum which is heard as a « *negligence in navigation of the ship* » or « negligence in the management of the ship"

The International Regulations for Preventing Collisions at Sea (ColReg 72) refers to :

> *"Every ship shall at all times keep a proper lookout by sight and sound, using also all available means appropriate to the prevailing circumstances and conditions, so as to enable the situation and the risk of collision to be fully appreciated (Regulation 5)."*

> *"Nothing in these Rules shall relieve any ship, its owner, master or crew from the consequences of any negligence in the observance of these Rules or of any precaution required by the ordinary experience of the seafarer or by the particular circumstances in which the ship is engaged (Regulation 1)."*

The shipowner is liable for his own negligence or vicariously liable for negligence of his crew and members of his organization.

But in the context of MASS we can wonder whether « *fault of the vessel* » could cover fault from the actors who will be part of the decision-making process.

- Seaworthiness

In its most fundamental sense, providing a seaworthy vessel requires the vessel being fit for the intended voyage, 'fit to meet and undergo the perils of sea and other incidental risks to which of necessity she must be exposed in the course of a voyage.

Seaworthiness is linked to have a sufficient, efficient and competent crew and also adequate and sufficient systems on board to address matters that might be encountered during the relevant voyage.

However, in this context, the question is whether we can adapt this concept in extending it to the new actors (data users, analysts, developers, programmers of software operating on MASS) or to limit this notion to the system (captor, sensor, camera …) ?