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**REGULATORY SCOPING EXERCISE AND GAP ANALYSIS OF CONVENTIONS
EMANATING FROM THE LEGAL COMMITTEE WITH RESPECT TO MARITIME
AUTONOMOUS SURFACE SHIPS (MASS)**

**Summary of results of analysis of IMO instruments
under the purview of the Legal Committee**

Submitted by Comité Maritime International (CMI)

SUMMARY

Executive summary: The submission includes a summary of the analysis by the Comité Maritime International Working Group on Maritime Autonomous Surface Ships (CMI IWG MASS) on conventions under the purview of the Legal Committee identifying provisions which may need to be clarified or amended and those provisions where no action is necessary

Strategic Direction, if applicable: 2

Output: 2.20

Action to be taken: Paragraph 34

Related documents: LEG 106/WP.5; MSC 99/INF.8

INTRODUCTION

Background

1 In 2017 the CMI IWG on MASS ("IWG") selected eight conventions for analysis and submitted a summary of the IWG work to the IMO Maritime Safety Committee (MSC 99/INF.8).

2 Following the report of the LEG Working Group on MASS dated 29 March 2019 (LEG106/WP.5), the IWG commenced an analysis of all conventions under the purview of LEG as per the list attached at annex 1.

3 The objective of the detailed analysis is to identify those provisions which may need amendment or clarification, and those where no action is necessary. The analysis may be found in document LEG 107/INF.4.

Process followed

4 In completing the analysis as contained in the spreadsheets in in document LEG 107/INF.4, the IWG adopted a similar approach to the LEG Working Group in its analysis of the conventions, using the same 4 degrees of autonomy (1 to 4) and the same 4 levels of response (A to D) as per the annex to document LEG 106/WP.5. Where appropriate, comments have been added in order to explain the approach taken, and general comments have been added where necessary.

5 This submission seeks to summarize, categorize and evaluate the legal issues arising by identifying those issues which involve terms or elements that feature in several of the conventions (Horizontal Issues) and those issues which tend to arise in a specific convention only. It may be that IMO will have an "overriding" approach to those issues which are common to many of the conventions, whereas a different approach may need to be adopted with those issues which are specific to a particular convention.

SUMMARY OF RESULTS OF CMI ANALYSIS

Horizontal Issues

6 The majority of issues identified by the IWG are horizontal or cross-cutting issues, involving terms or elements that feature in several of the conventions. These have been divided in three sub-categories: "Definitions", "Liability" and "Certification".

Definitions

7 Unlike most horizontal definitions, in relation to which the IWG has not identified any particular issues, the term "master" does seem to be in need of clarification. The extent to which the master can be one or more shore-based individual(s) is unclear. To the extent it can, there seems also to be a need to clarify the division of tasks between the master and operator. With both acting from the shore the current distinction will be less clear. The same issues feature with respect to many other IMO conventions, including several of the ones being addressed by the MSC.

Liability

8 Essentially, all liability provisions in the LEG conventions, whether establishing, limiting or excluding liability, raise one or more of the following issues in relation to MASS:

- Fault/negligence/recklessness/intention, etc.: the aforementioned prerequisites are human features. A "decision" taken by a machine therefore cannot be negligent, intentional, etc. according to the criteria developed in national laws.
- Causation: even where human negligence etc. can be identified (for example in erroneous programming or maintenance), it can be anticipated that it will be more difficult to establish that it was "a" or "the" cause of the damage.
- Vicarious liability: with a few exceptions, the extent to which the fault of others is attributable to the shipowner or carrier is not set out in the conventions. The standards established by national law essentially apply. As far as the IWG is aware, the circle of persons whose fault is attributable under national law in many situations does not extend to independent third party contractors. At the same time, independent contractors (such as internet providers, suppliers of computer

software etc.) are likely to play an increasingly important role for the safety of the ship.

- Personal fault of the shipowner or carrier: the circle of persons whose actions or omission are to be put on a par with the "personal act or omission" of the shipowner or carrier may need clarification in view of new actors performing MASS related tasks such as remote control centres.

9 In the view of the IWG, all the above issues need a clarification. While in respect of liability, the conventions seem capable as such to accommodate also the operation of MASS, given that the criteria for determining negligence, causation, etc. is essentially determined by national law, there is a risk for widely diverging results in various jurisdictions in relation to new MASS specific issues.

10 Apart from that, the extent to which the imposition of strict liability on the shipowner or carrier for loss caused by (particularly latent) defects in the autonomous system may need to be considered. A corollary of this is the need to consider whether additional exceptions to this liability should be considered.

11 Finally, there is a general policy question about whether new provisions and exceptions should be introduced for autonomous technology and its developers.

Certification

12 A new type of format, presumably electronic, for the various certificates required under the conventions needs to be considered, in particular in relation to a MASS of degree 3 or 4 without seafarers on board. Also, the issue of how the certificate can be requested by and made accessible to the relevant authorities would seem to require clarification.

Specific Legal Issues

13 Apart from the Horizontal Issues that give rise to matters of relevance to several conventions, the review of instruments has obviously also highlighted legal issues that are specific to particular conventions. Document LEG 107/INF.4 provides a full overview, but to illustrate the kind of issues that have been identified, some examples are provided below.

Athens Convention relating to the Carriage of Passengers and Their Luggage by Sea, 1974 with Protocols

14 The definition of "performing carrier" should be clarified, in terms of how it operates with respect to MASS degrees 3 and 4.

Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation, 1988 and 2005 with Protocols

15 The possibility of hacking may need special consideration in the context of MASS. The list of offences against a ship and persons on board a ship would likely benefit from appropriate interpretation, or development of a term like "cybercrime against the ship". The amending Protocol of 2005 enlarged the list of offences, yet still falls short of identifying hacking of a ship's systems as an offence.

16 The wording of certain provisions may need amendment in view of the possibility that a ship could be seized remotely. For example, additional elements could be included such as the location of a crime, division of principal/accomplice role, etc.

17 The practical aspects of boarding MASS may need to be addressed separately, with special focus on possibilities of stopping a fully autonomous vessel. Similarly, practical aspects relating to the detention of MASS also need clarification, though this applies to a number of IMO conventions.

International Convention on Salvage, 1989

18 Clarification is needed as to whether a shore-based remote operator can be considered to be a "master" for the purpose of concluding salvage contracts and whether entities other than the owner should be included for this purpose in the case of autonomous ships.

19 While the duty to render assistance will apply to MASS (which could be clarified), it should be recognized that the assistance that such ships can render will probably be more limited than in the case of manned ships. In case a salvage operation is undertaken by a remotely controlled or autonomous ship, it is necessary to examine whose act or which acts can be attributed to 'a salvor'.

20 It should be clarified whether "equipment and personnel" in the paragraph on salvor's expenses includes the shore-based equipment and personnel in the case of salvage by remotely controlled vessels. Similarly, when determining the apportionment ratio, it is not clear whether onshore personnel can constitute "persons in the service of each salvaging vessel".

International Convention Relating to the Arrest of Sea-Going Ships, 1952 and 1999

21 It is unclear to what extent claims for wages of shore-based controllers are enforceable by arrest.

22 A more practical issue relates to how to arrest a MASS when the control centre is elsewhere. In case of release, the issue may apply in reverse, as there will be a need to convey remote control back to the operators.

23 The bifurcation of the ship (structure) and the control centre raises the issue of exactly where the arrest is "made".

24 In situations, where the relevant MASS is dependent on an onshore control centre, judicial sale may become more complex, e.g. specifics of a transfer of control.

International Convention on Maritime Liens and Mortgages, 1993

25 With respect to claims secured by maritime lien, consideration will have to be given to whether shore-based crew should be protected in the same way as current provisions protect owner, demise charterer, manager or operator of the vessel.

26 Additional consideration needs to be given to whether the cost of upkeep of the onshore crew and their wages should be paid first out of the proceeds of sale.

CONCLUSION

27 The review of instruments under the purview of the Legal Committee, as presented in document LEG 107/INF.4 has given rise to few immediate legal obstacles. In particular, there is not a single provision that has been identified in document LEG 107/INF.4 as preventing MASS, at any of the four degrees of autonomy, and hence considered to be in immediate need

of amendment. Some of the conventions reviewed call for no particular action, whatever the degree of automation.

28 Rather, the introduction of MASS gives rise to a series of questions of application of the conventions addressed in LEG 107/INF.4. Many of these issues would benefit from clarification, either in the form of amendment or through lighter measures, such as joint interpretation.

29 The main part of the identified issues are horizontal in nature, i.e. involve terms or elements that feature in several of the conventions and most of them become truly problematic only at the fourth degree of autonomy, that is, when the ship is operated autonomously, without human involvement and oversight.

30 Another observation is that many of the key issues raised by MASS are currently not addressed in the conventions but left to national legal systems. Examples include the definition of fault, range of liable parties, role of remote controller or requirements related to evidence. It is possible, of course, to continue to leave such matters outside the scope of the conventions. On the other hand, the introduction of MASS is likely to emphasize the need for a harmonized approach to such matters.

31 A fundamental question in this respect is whether a shift towards MASS calls for a change of the basis of liability in maritime liability conventions, that is, whether liability for damage caused by MASS should be strict or based on different legal presumptions than is the case today. Another issue is whether MASS should alter the range of persons and entities subject to - or exempted from - liability in the conventions.

32 Such alterations could be justified by the changes in how operational decisions are made and the different risks involved, in particular at the fourth degree of autonomy, compared to the traditional operation of ships. Another justification could be the increased role that parties, such as equipment manufacturers, IT-system providers, class and shipyards, will have over operational and navigation decisions made by MASS.

33 However, these are policy matters to be discussed by the Committee in the future. The review of the instruments indicates no particular preference for a certain outcome in this respect. Rather, the review in LEG 107/INF.4 appears to suggest that existing conventions under the purview of the Committee are well-designed to meet a shift towards MASS in the future. While a series of clarifications are desirable, or even necessary, none of them requires immediate amendment and most of the issues arise only at the fourth degree of autonomy.

ACTION REQUESTED OF THE COMMITTEE

34 The Legal Committee is invited to note the information provided and take action, as appropriate.

ANNEX 1

LIST OF LEG CONVENTIONS INCLUDED IN CMI ANALYSIS

- 1 International Convention on Civil Liability for Oil Pollution Damage, 1969 (CLC 1969) - with Protocols of 1976 (CLC Prot 1976) and 1992 (CLC Prot 1992)
 - 2 International Convention on Civil Liability for Bunker Oil Pollution Damage, 2001 (BUNKER)
 - 3 International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea, 1996 (HNS 1996) with Protocol 2010 (HNS Prot)
 - 4 International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1992 (FUND) with Protocol 2003 (FUND Prot)
 - 5 Convention on Limitation of Liability for Maritime Claims, 1976 (LLMC)
 - 6 Athens Convention relating to the Carriage of Passengers and their Luggage by Sea, 1974 (PAL 1974)
 - Protocol of 1976 to the Athens Convention relating to the Carriage of Passengers and their Luggage by Sea, 1974 (PAL Prot 1976)
 - Athens Convention Relating to the Carriage of Passengers and their Luggage by Sea, 2002 (PAL 2002 Convention) (consolidated text)
 - 7 Nairobi International Convention on the Removal of Wrecks, 2007 (NAIROBI)
 - 8 Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation, 1988 (SUA 1988 Convention)
 - Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation, 2005 (SUA 2005 Convention) (consolidated text)
 - 9 Protocol for the Suppression of Unlawful Acts against the Safety of Fixed Platforms located on the Continental Shelf, 1988 (SUA 1988 Fixed Platforms Protocol)
 - Protocol for the Suppression of Unlawful Acts against the Safety of Fixed Platforms located on the Continental Shelf, 2005 (SUA 2005 Fixed Platforms Protocol) (consolidated text)
 - 10 International Convention on Salvage, 1989 (SALVAGE)
 - 11 International Convention Relating to the Arrest of Sea-Going Ships, 1952 (ARREST 1952) and International Convention on Arrest of Ships, 1999 (ARREST 1999)
 - 12 Convention relating to Civil Liability in the Field of Maritime Carriage of Nuclear Material, 1971 (NUCLEAR);
 - 13 International Convention on Maritime Liens and Mortgages, 1993 (ICMLM)
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14 International Convention relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, 1969 (INTERVENTION)
