Autonomous Wrecks

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1 Introduction

One of the emerging and evolving fields in transport law is autonomous transport. Autonomous vessels, used in such transportation, are likely to play an important role in future shipping and already today development is underway to introduce autonomous transport solutions for both cargo and passengers.[[1]](#footnote-1) This development raises a number of questions as to how this form of transportation relates to the established regulatory frameworks in maritime law.[[2]](#footnote-2) One such issue concerns what happens should such vessels be subject to maritime casualties.[[3]](#footnote-3) In order to, hopefully, shine some light on this topic, this text discusses autonomous transport and, more specifically, the vessels involved from a wreck law perspective with a focus on how such vessels can be handled under the main international convention on the area, the Nairobi International Convention on the Removal of Wrecks (wrc). The general outline of the convention is discussed along with its potential application on autonomous vessels. Furthermore, some problems that can arise when the legal framework is applied in relation to autonomous vessels are discussed along with some observations that can be made when assessing such an application. Finally, some conclusions are drawn in relation to the findings in the text. First of all, however, some general remarks are made on the nature of autonomous vessels.

2 Autonomous Vessels

Different variations of autonomous vessels can be envisaged depending on their respective functions and attributes. They can also be referred to by different names. One denotation is unmanned maritime vehicles.[[4]](#footnote-4) These can be defined as ‘vehicles that are capable of controlled, self-propelled movement in water without any personnel on board’ operating on or below the water surface.[[5]](#footnote-5) Another possible denotation is unmanned maritime systems of different kinds.[[6]](#footnote-6) Furthermore, such property can also be referred to as autonomous ships or vessels.[[7]](#footnote-7) The key function and characteristic in all these denotations is that the vehicle, system, ship or vessel is in some sense unmanned.[[8]](#footnote-8) Another way of expressing this is that the property, as a result of the above, is in some sense autonomous when compared to traditional vessels. Unless there is a need for further distinction, all of these vehicles and vessels will be referred to as autonomous vessels or autonomous wrecks in this text for the sake of clarity.

Further distinctions can be made in order to differentiate between different autonomous vessels. One central aspect is the degree of autonomy that can vary between vessels of this kind.[[9]](#footnote-9) Some vessels may be remotely controlled and operated by someone at another location, eg from on board another vessel or from the shore, while others can be more or less entirely autonomous in the sense that they are programmed to navigate on their own and eg utilize artificial intelligence in such a way as to avoid collisions while fulfilling the purpose that they serve.[[10]](#footnote-10) Even though the latter category can be described as more autonomous, when compared to the former, there may also be remote monitoring in relation to such vessels, eg triggered by certain events that the autonomous vessel identifies that require additional supervision.[[11]](#footnote-11) Further distinctions can, of course, be made and the different categories can also be combined in different ways.[[12]](#footnote-12)

Another common denominator between these different vessels is that they are often relatively small in size.[[13]](#footnote-13) Even today’s larger autonomous vessels seldom have a length of more than 10 meters.[[14]](#footnote-14) It is, however, possible that future autonomous vessels will be substantially larger and such vessels are also developed, eg ferry-like vessels designed for carrying passengers.[[15]](#footnote-15) The discussion above clearly shows that autonomous vessels are multifaceted and that the concept includes many variations and vessels with different characteristics. They may share some common denominators in the sense that they, to various degrees, are unmanned and relatively small in size, but there can also be major differences between vessels of this kind. The fact that they are relatively small in size may, furthermore, be subject to change in the future with advanced technology and innovation. Such an evolution will make the need to establish clarity as to how such vessels relate to maritime law even more acute. Having thus established an overview of this kind of property, the text now turns to discuss the issue of what happens should such vessels turn into wrecks and whether the main convention on this area, the wrc, can be applicable in relation to autonomous vessels.

3 Wreck Removal Convention

Before a potential application on autonomous vessels is discussed, a brief outline is given of the wrc in order to illustrate its main structure. The convention was adopted in Nairobi, Kenya, in 2007. Its creation had, however, been ongoing since long before that and the need for a convention on this area was recognized already during the 1970s.[[16]](#footnote-16) The convention entered into force in 2015 and has in the years since then gathered large international support. At the time of writing there are 57 State parties to the convention and among them the United Kingdom, Liberia, Panama and the Marshall Islands.[[17]](#footnote-17) These are important State parties since they are also large flag States.[[18]](#footnote-18) Furthermore, the States within the EU have endorsed ratification processes of the convention and it seems plausible that all of the major shipping nations in Europe will become parties to the convention.[[19]](#footnote-19) The ratification process has thus been a success.

3.1 General Structure of the Convention

There is no room to discuss the convention at length in this context.[[20]](#footnote-20) Instead, its general structure and major components are discussed in order to illustrate how the system works as well as the underlying reasons behind why the convention was developed in the first place.

The purpose of the convention is to provide mechanisms to deal with wrecks that pose hazards to the navigation of other vessels or to the marine environment and, furthermore, to provide a system for their removal while also establishing liability for costs associated with these actions. An underlying purpose is also to harmonize the regulations on this area of law between State parties.[[21]](#footnote-21) The aim of these purposes is to fill two identified legal gaps in relation to wrecks and wreck removal. The first is an uncertainty as to a State’s power to intervene outside of its territorial waters. The second concerns the problem with enforcing claims for wreck removal costs as well as enabling insurance cover for arising liabilities as a consequence of wrecks and wreck removal.[[22]](#footnote-22) Claiming wreck removal costs can be problematic even if there are regulations in place that make the shipowner liable for such costs. Shipping companies can be constructed in such a way that a ship is owned by a limited company, whose only main asset is the ship in question. Upon a wreckage, the ship is likely to have no positive net value and the company then becomes insolvent. Even if existing provisions make the shipowner liable in such a case, there will be no success in actually enforcing this responsibility since the company has no remaining assets and cannot pay.[[23]](#footnote-23) In order to deal with this risk, the convention establishes compulsory insurance for arising liabilities under the convention along with a possibility to claim the insurer directly.

There is, however, a limit in place that exempts smaller ships from this obligation. Thus, the registered owner of a ship of 300 gross tonnage and above is required to maintain insurance or other financial security to cover arising liabilities under the convention.[[24]](#footnote-24) This compulsory insurance shall cover an amount up to the relevant limitation amount, but not exceeding the amount that follows from the Convention on Limitation of Liability for Maritime Claims (llmc).[[25]](#footnote-25) The fact that the convention relates the insurance amount to the llmc in this way, means that it places a cap on possible claims against the insurer.[[26]](#footnote-26) As stated earlier, claims can be made directly against the insurer of the compulsory insurance.[[27]](#footnote-27) This is an important part of the framework, since it secures the possibility to claim compensation from an additional party should no such claim be possible to enforce against the shipowner on the grounds discussed above.

The convention does not target all wrecks.[[28]](#footnote-28) Instead, it focuses on certain hazards that wrecks can pose. The identified hazards in the convention are wrecks that pose hazards to navigation or the marine environment.[[29]](#footnote-29) More specifically, wrecks that pose a danger or impediment to navigation or that may reasonably be expected to result in major harmful consequences to the marine environment, or damage to the coastline or related interests of one or more States are covered.[[30]](#footnote-30) If a wreck constitutes a hazard in this way, the convention states that the registered owner has a duty to remove it.[[31]](#footnote-31) The registered owner is also liable for costs associated with locating, marking and removing the wreck as discussed in the following.[[32]](#footnote-32) A removal, in line with the convention, is not directly concerned with actually removing the wreck, even if this may be the end result. Instead, the removal is linked to the hazard that the wreck poses. This follows from the definition of removal in the convention, where it is stated that a removal is to be seen as ‘any form of prevention, mitigation or elimination of the hazard created by a wreck’.[[33]](#footnote-33) This means that it may, as an example, be sufficient to only remove certain property from the wreck in order to remove a hazard to the marine environment.[[34]](#footnote-34) Likewise, a navigational hazard may be removed by removing certain parts of the wreck in order to secure sufficient depth in a shipping lane. In some cases, however, it may also be necessary, and perhaps easier, to remove the whole wreck in question.[[35]](#footnote-35)

There is also a definition of wreck in the convention. It states that the concept of wreck means:

(a) a sunken or stranded ship; or

(b) any part of a sunken or stranded ship, including any object that is or has been on board such a ship; or

(c) any object that is lost at sea from a ship and that is stranded, sunken or adrift at sea; or

(d) a ship that is about, or may reasonably be expected, to sink or to strand, where effective measures to assist the ship or any property in danger are not already being taken.[[36]](#footnote-36)

The definition of wreck is thus broad and covers a range of ships and objects depending on the circumstances in the case. The inclusion of any object that has been on board a ship means that eg floating containers, that have been washed overboard, are included and regarded as wrecks under the convention.[[37]](#footnote-37) The same is true for a ship that is still unharmed and afloat, provided that it may reasonably be expected to sink or strand if left adrift and no salvage or other effective measures are taken in relation to the ship. In this sense, the wide definition also allows for preventive actions in these situations. It, however, also means that the term wreck is given a wide meaning that may differ quite substantially from the understanding of the word in normal parlance.[[38]](#footnote-38) The inclusion of effective measures in the definition, when it comes to ships that are about or may reasonably be expected to sink or strand, also entails that a ship that at one stage would fall within the definition of wreck, subsequently may fall outside of it if, as an example, a salvor approaches and renders effective salvage services in relation to the ship.[[39]](#footnote-39)

The concept of wreck is, furthermore, tied to the occurrence of a maritime casualty, in the sense that a wreck is seen as the end result of a ship or some other object on board or from a ship, that has turned into a wreck following such a casualty. It is only if these conditions are met that the liability regime and the other parts of the wrc become applicable. A maritime casualty is defined as ‘a collision of ships, stranding or other incident of navigation, or other occurrence on board a ship or external to it, resulting in material damage or imminent threat of material damage to a ship or its cargo’. This is also a wide definition and it has been argued that it is hard to envisage situations involving wrecks that are unconnected with a maritime casualty when defined in this way.[[40]](#footnote-40) One such potential case, however, is a ship that is dumped or sunk for operational reasons as well as ships that have been abandoned where no other event has taken place that can be linked to the definition of a maritime casualty.[[41]](#footnote-41)

A wreck is, as discussed, seen in the convention as the end result of a ship that has suffered a maritime casualty. If such a wreck poses a hazard to navigation or the marine environment, the full liability regime and the other provisions in the wrc will be applicable on the wreck. The central concepts in the convention thus work like a chain. First, there needs to be a ship in light of the convention. This ship is then to be subject to a maritime casualty, after which the ship or some object from the ship or on board it is to fall under the definition of wreck in the convention. The different duties and obligations that follow from the convention then continue this chain of events. Thus, when a ship has suffered a maritime casualty with a wreck as an end result, the master and operator shall report to the State, in whose convention area the ship is located, that this has taken place.[[42]](#footnote-42) Various information shall be included in this report, with the purpose of enabling the affected State to make an assessment as to whether the wreck poses a hazard to navigation or the marine environment in light of the convention.[[43]](#footnote-43) Upon receiving the report, the affected State shall then make this assessment.[[44]](#footnote-44) Another step in this process is for the affected State to locate the wreck and to mark it should it constitute a hazard.[[45]](#footnote-45)

If the State determines that the wreck is hazardous in line with the convention, this assessment is to be communicated to relevant parties.[[46]](#footnote-46) Importantly, this also triggers the responsibility of the registered owner to remove the wreck.[[47]](#footnote-47) The registered owner has the possibility to remove it, eg by contracting a wreck removal operation with a relevant party, but there are also mechanisms for the State to take action if this is not executed as prescribed in the convention or if immediate action is necessary.[[48]](#footnote-48) The registered owner is liable for the costs involved in all these stages of the process, ie the costs of locating, marking and removing the wreck.[[49]](#footnote-49) As already discussed, this liability is also, for ships of 300 gross tonnage and above, combined with compulsory insurance, up to the relevant limitation amount under the llmc, as well as the possibility to claim the insurer directly for arising costs under the convention.[[50]](#footnote-50)

3.2 Is the Convention Applicable on Autonomous Vessels?

Having discussed the general outline of the convention, the text now turns to discuss its potential application on autonomous vessels. The applicability of the convention is linked to the defined concepts of ship and wreck as discussed above. In order for the system to operate in relation to autonomous vessels, the vessel in question thus needs to fall within the definitions used in the convention. Since the convention deals with ships that are subject to maritime casualties resulting in that the ship or some object on board or from the ship is to be considered a wreck, it becomes necessary to discuss whether autonomous vessels are to be regarded as ships or not in light of the convention.

The general question of whether autonomous vessels are to be regarded as ships, has previously been discussed in relation to the United Nations Convention on the Law of the Sea (unclos) and other regulations such as the general regulatory framework within the International Maritime Organization (imo).[[51]](#footnote-51) The question of whether autonomous vessels are to be regarded as ships is complicated by the fact that the term ship in itself is nebulous. There is no general definition of the concept and there have been various discussions in the past as to what this concept actually means.[[52]](#footnote-52) The concept can mean different things in different contexts and the chosen definitions vary in international conventions.[[53]](#footnote-53) Some common denominators from different regulations and legal systems, however, are that a ship is to have buoyancy, be able to steer and navigate in water and to transport cargo or people.[[54]](#footnote-54)

Whether to treat autonomous vessels as ships or not is not a binary question and the answer is likely to vary depending on the nature of the vessel at hand. As already discussed, there are many variations of autonomous vessels with various degrees of autonomy. Some commentators have suggested that autonomous vessels, or at least a number of them, are to be regarded as ships under unclos.[[55]](#footnote-55) Moreover, when it comes to autonomous vessels that would operate like traditional commercial vessels, in the sense that they would carry cargo or passengers, it is difficult to see why the fact that the vessel is unmanned or autonomous should in any way differentiate its obligations to follow the rules and standards that follow from established legal frameworks.[[56]](#footnote-56) This would suggest that autonomous vessels should be regarded as ships at least when they are comparable to other traditional ships. There may, however, be cases where the functionality of the vessel in question is so different, that it would not be reasonable to classify it as a ship. As an example, if an autonomous vessel is closely linked to a mother ship, from which it is controlled and operated, it may be more reasonable to view it as a part of that ship instead of as a separate ship.[[57]](#footnote-57)

Another way of solving the question of whether autonomous vessels are to be regarded as ships, would be to link the answer to the assessment of the flag State. In that sense, an autonomous vessel is to be regarded as a ship if the flag State defines it as such provided that it follows the established rules on manning, safety and so on in the regulatory system.[[58]](#footnote-58) The above discussion suggests that even if there are various opinions and views as to how autonomous vessels are to be classified, it is clear that there are arguments that point in favour of recognising at least some of these vessels as ships.

The fact that autonomous vessels in some cases can be classified as ships does not, however, necessarily mean that they also will fall under the wrc. Since there is no general definition of the concept, it is necessary to discuss how autonomous vessels fit within the system of the wrc. The main question thus becomes if these vessels fall under the definition of ship in the convention. A ship is defined as ‘a seagoing vessel of any type whatsoever and includes hydrofoil boats, air-cushion vehicles, submersibles, floating craft and floating platforms, except when such platforms are on location engaged in the exploration, exploitation or production of seabed mineral resources’.[[59]](#footnote-59) This is an extensive definition that covers various different kinds of property.

Shaw has described the definition of ship in the wrc as ‘exceptionally wide’.[[60]](#footnote-60) In a similar way, Gaskell and Forrest, have referred to it as a ‘broad definition’ that is ‘much wider than that in some other maritime conventions’ and that this should be taken into account when the convention is interpreted.[[61]](#footnote-61) This suggests that an inclusive stance is to be taken when evaluating whether autonomous vessels fit within the definition. The fact that the definition, furthermore, refers to a ‘vessel of any type whatsoever’ can also be viewed as an extensive phrasing that invites new categories of vessels, like autonomous vessels, to fall within its scope. It is also notable that the definition includes submersibles, which is a common form of autonomous vessel. There is also no size requirement, meaning that also smaller vessels fall under the definition. In this way, the fact that autonomous vessels often are small in size is not a problem either. These observations combined suggest that autonomous vessels, or at least some of them, in line with the discussion above, will fall under the definition of ship in the wrc.[[62]](#footnote-62) Another notable inclusion in the definition, however, is that it refers to a ‘seagoing vessel’. This choice of wording suggests a distinction in the definition between ships that are seagoing and those that are not. When it comes to autonomous vessels that are to be considered as ships, this would mean that only the ones that are seagoing would be encompassed in the convention. It is, however, not clear what the term seagoing means in this context.[[63]](#footnote-63) Since it is used, it would suggest the above demarcation in relation to ships that are not seagoing. One construction of this is that the definition does not encompass ships that only navigate on rivers.[[64]](#footnote-64) The same may be true in relation to other parts of a State’s internal waters that are not to be classified as sea. It is, however, unclear what the term means and how far the sea stretches in this case. Given the possibility to extend to convention’s scope of application also to a State’s internal waters and territorial sea, this creates some incongruity since a State is likely to wish the framework to be applicable in areas where ships can pose a hazard, eg in a harbour.[[65]](#footnote-65) It is thus uncertain what effect the inclusion of the word seagoing has on the applicability of the convention, but the construction of the concept may pose problems for the applicability of the wrc on certain autonomous vessels that are eg designed to operate in areas close to shore or in internal waters.[[66]](#footnote-66)

However, also more extensive constructions of the word seagoing may be possible in some cases. The term could be understood as a vessel being able to float on the sea or water. Such a view would extend the definition’s scope and may be arguable especially in legal systems not directly connected with English law and the similar constructions and case law in that system.[[67]](#footnote-67) The same may be true for States that have not traditionally made any division or distinction between seagoing ships or transportation and ships used for river-going or inland waterway transportation.[[68]](#footnote-68) As an example, the narrower construction of seagoing, as described above, is not found in the Swedish implementation of the wrc. The term seagoing is not implemented in the legislation in connection with the term ship.[[69]](#footnote-69) On the contrary, the preparatory works suggest a broader construction also encompassing ships that are not able to navigate on the sea.[[70]](#footnote-70) The implementation also extends the framework to apply in all of Sweden as well as its exclusive economic zone, meaning that it is applicable in eg rivers and inland lakes.[[71]](#footnote-71) This more extensive construction will also mean that the regulation potentially will be applicable on more autonomous vessels.

Apart from the instances already discussed, the convention may also become relevant in relation to autonomous vessels even if they are not to be regarded as ships under the convention. This is a consequence of the wide definition of wreck in the convention and is relevant should an autonomous vessel be on board another ship.[[72]](#footnote-72) If the ship is subject to a maritime casualty that results in the autonomous vessel being eg washed overboard, the vessel would in fact fit within the definition of wreck despite of the fact that the autonomous vessel in itself would not be classified as a ship under the convention. The autonomous vessel would in that case be treated as an object that has been on board a ship.[[73]](#footnote-73) This situation is similar to a container that has been washed overboard. Consequently, in some cases, autonomous vessels that are not to be classified as ships may still be covered under the convention if they were on board another vessel that is to be considered a ship and that suffers a maritime casualty, as defined in the convention, causing the autonomous vessel to become a wreck.[[74]](#footnote-74) In these cases, the liable party under the convention will, of course, be the registered owner of the ship in question and not the owner of the autonomous vessel should they differ.[[75]](#footnote-75) The discussion above shows that autonomous vessels may be subject to the wrc in various situations, but that there also may be instances where an autonomous vessel will not fall within the definitions used in the convention. Given that at least some autonomous vessels are likely to be subject to the wrc, the discussion in the next section turns to some problems that can arise as a consequence of this as well as some observations that can be made when assessing such an application.

4 Problems and Observations

Even for autonomous vessels that are to be regarded as ships under the convention, there may be some problems that can arise as a consequence of such an application as well as things to take into account given the special characteristics of autonomous vessels and the practical context in which they are likely to operate. These concern the convention’s geographical scope of application, its provision on reporting wrecks and its way of providing financial security for arising liabilities by compulsory insurance as well as the convention’s relation to State vessels.

4.1 Geographical Scope of Application

An interesting inclusion in the convention is its flexibility when it comes to its geographical scope of application.[[76]](#footnote-76) The default position is that the convention is applicable in the exclusive economic zone of a State.[[77]](#footnote-77) This will, of course, have a fundamental effect on which autonomous vessels and wrecks that may be subject to the convention in a given situation. As already discussed, autonomous vessels may be designed to primarily navigate close to shore or in inland waters.[[78]](#footnote-78) In regards to a State that has implemented the convention with the default position, this will, consequently, result in that such autonomous vessels will not fall within the scope of the convention even if they would fall under the definitions of ship and wreck. It can also be noted, in this context, that most maritime casualties that result in hazardous shipwrecks are likely to occur close to shore or in the territorial sea.[[79]](#footnote-79) The convention, however, also includes an opt-in possibility for State parties that wish to extend the geographical scope of application. Thus, a State party can choose to extend the convention ‘to wrecks located within its territory, including the territorial sea’.[[80]](#footnote-80) In the same way as above, but the other way around, extending the geographical scope of application in this way, will entail that potentially more autonomous vessels will fall under the convention. This will be the case for the autonomous vessels referred to above that are designed to navigate and carry out operations in close vicinity to the shore and in the territorial sea.

A consequence of the above is, furthermore, that the flexible geographical scope of application will result in that the convention’s applicability on autonomous vessels will vary between State parties. In a given situation, it is thus necessary to assess whether an autonomous vessel falls under the convention depending on whether the State has chosen to extend its scope of application or not via the opt-in-clause. It may also, in this context, be relevant to point out that the construction of the convention also means that autonomous vessels that navigate solely on the high seas will not fall under the scope of the convention, since the convention is not applicable there.[[81]](#footnote-81)

4.2 Reporting an Autonomous Wreck

Another relevant aspect of the convention to discuss in this context, concerns how a maritime casualty that has resulted in a wreck is to be reported. According to the convention, the master and operator has a duty to report to an affected State if their ship has suffered a maritime casualty that has resulted in a wreck.[[82]](#footnote-82) This could potentially cause problems in relation to autonomous vessels, since there will be no master on board the vessel if it is unmanned. An autonomous vessel would thus seem hard to reconcile with this part of the convention.

As noted, however, the obligation to report also falls on the operator of the ship. The operator is defined as ‘the owner of the ship or any other organization or person such as the manager, or the bareboat charterer, who has assumed the responsibility for operation of the ship from the owner of the ship and who, on assuming such responsibility, has agreed to take over all duties and responsibilities established under the International Safety Management Code, as amended’. This subject will still be present even if the autonomous vessel is unmanned, since it will, reasonably, have an owner or some other relevant party in line with the definition. It, furthermore, suffices that one of either the master or the operator makes the report.[[83]](#footnote-83) In this way, the provision on reporting still seems to work on autonomous vessels, although to a lesser extent when compared to traditional vessels that have masters on board. Potentially, it could, moreover, also be possible to construe the term master in an extensive way as to encompass someone remotely controlling the ship in question. In that case there would be no problems with the article on reporting, since the obligation to report would extend also to this person when it comes to ships like these.[[84]](#footnote-84)

4.3 Compulsory Insurance

The wrc is applicable on wrecks in general without any size requirement. Thus, the registered owner of a wreck that falls under the scope of the convention has a duty to act in accordance with its provisions and is liable for arising costs regardless of the size of the ship. This will also be true in relation to wrecks from autonomous vessels to which the convention is applicable. One crucial aspect of the convention that is, however, not extended to all wrecks is, as discussed, the compulsory insurance. The compulsory insurance is only applicable in relation to a ship of 300 gross tonnage and above.[[85]](#footnote-85) This, of course, also affects the possibility to claim an insurer directly for arising costs under the convention.[[86]](#footnote-86) As noted before, a common denominator between autonomous vessels is their relatively small size. This means that they are not likely to be subject to compulsory insurance and the possibility of claiming the insurer directly in line with the wrc. This can be of major significance for the actual possibility of enforcing an arising liability under the convention when it comes to autonomous vessels. With advancing technology and development, it is, however, possible that autonomous vessels will increase in size in such a way that some of them also become subject to the insurance requirement.

The compulsory insurance is important since it is not uncommon that the registered owner of a vessel is unable to pay arising liabilities. As mentioned above, this can be an effect of the ship being owned by a limited company whose only main asset is the ship in question. Upon a wreckage, the company becomes insolvent and any arising liabilities, eg for wreck removal costs under the convention, will not be paid since the company has no remaining assets. In the case with autonomous vessels that are not subject to the compulsory insurance and owned in this way, this will mean that it can become difficult to enforce claims under the convention. This is important to keep in mind, since one of the main objectives of the convention is to provide a framework that offers financial securities for arising liabilities.[[87]](#footnote-87) It is, of course, possible that the company structures may differ in relation to autonomous vessels, but there is no reason not to expect one-ship company structures emerging also for this kind of enterprise and especially if they are to fall under the legal frameworks that can result in liabilities. This potential problem with enforcing arising liability claims under the convention in relation to smaller autonomous vessels is thus another thing to keep in mind in this context.

Another possible issue with autonomous vessels, should they be large enough to be subject to the compulsory insurance, is that it would perhaps seem strange for the certificate, attesting compliance with the demand for compulsory insurance, to be carried on board the vessel if it is unmanned.[[88]](#footnote-88) Even though this, of course, could be done, there would be no one on board to actually manage the certificate. A future development could be to introduce digital solutions and registers in order to avoid this problem.[[89]](#footnote-89) Already today, it follows from the convention that a copy of the certificate is to be ‘deposited with the authorities who keep the record of the ship’s registry or, if the ship is not in a State Party, with the authorities issuing or certifying the certificate’.[[90]](#footnote-90) This could be expanded in such a way as to enable a central registry where certificates from eg autonomous vessels are collected. This would, however, require additional regulation on this issue. In order for an autonomous vessel, that is subject to the compulsory insurance, to act in accordance with the convention, it would thus seem necessary to have the certificate present on board the vessel despite the fact that it is unmanned.

4.4 Autonomous State Vessels

Another potential issue that can be raised in relation to autonomous vessels and the wrc, is that such vessels can be tightly linked to States and State interests in different ways. It may be that a State has developed autonomous vessels in order to carry out certain tasks or operations for the State. A close linkage to a State may lead to the autonomous vessel being regarded as a State vessel. The wrc excludes from its application any ‘ship owned or operated by a State and used, for the time being, only on Government non-commercial service’.[[91]](#footnote-91) If an autonomous vessel, in this way, is owned or operated by the State in question and is used in this non-commercial way, it would thus mean that the vessel is not subject to the wrc even if the vessel as such would fall under its definitions of ship and wreck. This is thus another issue to keep in mind when it comes to autonomous vessels and the wrc.

Another use for autonomous vessels is within the defence sector and the military.[[92]](#footnote-92) In these cases, it may be relevant to view the autonomous vessel as a warship.[[93]](#footnote-93) As an example, in the US two ‘large unmanned surface vessels’ have been approved for purchase by the US Congress in order to develop ‘an external missile magazine that can autonomously find its way to the fleet, expend missiles and work its way back to reload’.[[94]](#footnote-94) Autonomous vessels can also be used in this setting for surveillance or reconnaissance missions as well as to handle mines.[[95]](#footnote-95) Autonomous vessels like these are likely to be viewed as either warships or vessels owned or operated by a State and used solely on a Government non-commercial service and are thus excluded from the convention.[[96]](#footnote-96)

There is, however, a possibility for State parties to extend the convention’s scope of application also to its own State vessels.[[97]](#footnote-97) This would mean that the convention is to be applied in relation to the State vessels of that State in line with the specific terms and conditions set by the State for this application. It is, however, important to note that this will have no effect in relation to State vessels from other States. It is, thus, not possible for a State to extend the scope of application to other State vessels and these will still fall outside the convention unless these States, in turn, have extended the convention’s scope of application in this way as well.

Autonomous vessels may thus be excluded from the convention as a consequence of the fact that they are developed, owned and operated by States on a Government non-commercial service or as warships, but there may also be exceptions to this should a State have chosen to extend the convention to apply to its State vessels as well. In order to find out whether a certain autonomous vessel is excluded or not in a given situation, it would thus be necessary first to establish if the vessel is to be viewed as a State vessel, i.e. owned or operated by a State and used only on Governmental non-commercial service or should be regarded as a warship in line with the convention. If that is the case, the default position is that the vessel is excluded from the convention should that State, to which the vessel belongs, not have chosen to extend the applicability of the convention to its own State vessels.

5 Conclusions

The discussion above has shown that there are a lot of variations when it comes to autonomous vessels and that this variation will have an effect on which vessels that may be subject to the wrc. There are, however, a number of factors that point in favour of applying the convention on a number of such vessels. This is especially the case when an autonomous vessel, more or less, resembles a traditional ship, eg in the sense that it operates commercially transporting cargo and passengers. In these cases, it is hard to see why the mere fact that the vessel is autonomous should prevent it from falling under the definition of ship in the wrc. The definition is also wide and should, arguably, be interpreted in an inclusive way. It thus seems reasonable to assume that there are good prospects for autonomous vessels falling under the definition of ship in the convention.

One aspect that may, however, limit a potential application, is the inclusion of the term seagoing in the definition. This may impact and restrict the possible scope of application in relation to autonomous vessels that are not deemed as seagoing. As the discussion has illustrated, however, there is uncertainty as to what this term actually means and the Swedish implementation of the convention, as an example, does not restrict the definition in this way. Potentially more extensive constructions can thus be envisaged that would allow for more autonomous vessels to fall within the definition in some cases and this would mean that implementations may differ as to which autonomous vessels that fall under them in this respect. There is, however, reason to be cautious when it comes to construing the definition too extensive, given the fact that the wrc is an international convention with an underlying purpose to provide uniformity and harmonize this area of law.

For those autonomous vessels that do fall within the concept of ship in the wrc, there are, furthermore, some problems that may arise and some aspects to observe when assessing the question of applicability. The convention’s flexible geographical scope of application, will mean that the number of autonomous vessels that will fall under the convention will vary, depending on whether the State in question has extended the geographical scope of the convention via the opt-in clause or not. Since most accidents are likely to occur close to shore or in the territorial sea, this will have a big impact on the number of autonomous vessels that will actually fall under the scope of the convention in a State party.

There may, furthermore, be problems with the obligation to report wrecks under the convention when it comes to autonomous vessels. The obligation refers to the master or operator of a ship and an autonomous vessel that is unmanned will lack a master on board, which would seem to impact on the possibility to comply with this part of the convention. Since an autonomous vessel will, reasonably, have an operator, as defined in the convention, and the obligation falls on either the master or the operator, this is, however, arguably not that much of a problem. It could, potentially, also be possible to view a person that remotely controls the autonomous vessel as the master, enabling a full application of the provision on reporting in that case.

Another observation that can be made, in respect of autonomous vessels that fall under the convention, is that many of these vessels are likely to be under the size limit for the compulsory insurance that the convention calls for. This may have a large impact on the possibility of a State party to enforce liability claims against the owner of such vessels, since it results in that there may be no insurance cover and no possibility to claim the insurer directly for such costs. For autonomous vessels that will be owned in one-ship company structures, this may pose problems when it comes to claiming arising liabilities under the convention.

Furthermore, another potential issue regards the certificate that, according to the convention, is to be kept on board the ship evidencing compliance with the call for compulsory insurance. This order may seem strange in relation to an autonomous vessel that is unmanned and where there will be no person on board that can handle the certificate. One way of solving this could be to create a central register that includes all such certificates, but this would require regulatory changes. In order to comply with the convention, it would thus seem that autonomous vessels, that are subject to compulsory insurance, need to have these certificates on board even though the vessels are unmanned.

An additional circumstance that may exclude autonomous vessels that would otherwise fall under the definition of ship in the convention, is that they could be regarded as State vessels. This will be the case for autonomous vessels that are owned or operated by a State and that are used only on Government non-commercial service. As discussed, there are several variations of autonomous vessels that may be of this kind. The same is true in relation to warships, which certain autonomous vessels could, arguably, also be classified as. These autonomous vessels would thus not be subject to the convention, even though they may fall under its definition of ship, unless the State in question has chosen to extend the convention’s scope of application to its own State vessels.

As a final general observation, it is clear that there are a lot of variables that need to be taken into account and that may affect whether an autonomous vessel will fall under the wrc or not. This question will, consequently, need to be evaluated on a case-to-case basis, taking all of the above factors into account. This also, finally, serves as an illustrative example that the design and construction of the wrc can sometimes be difficult to reconcile with one of its main objectives, ie providing uniformity and harmonizing the procedures in regards to handling and removing hazardous wrecks.

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1. Eric Van Hooydonk, ‘The law of unmanned merchant shipping – an exploration’ (2014) 20(3) The Journal of International Maritime Law 403, 403; Robert Veal and Michael Tsimplis, ‘The integration of unmanned ships into the lex maritima’ (2017) 2017 Lloyd’s Maritime & Commercial Law Quarterly 303, 304; Måns Jacobsson, ‘What Challenges Lie Ahead for Maritime Law?’ in *Maritime Law in Motion* (Springer 2020) <https://doi.org/10.1007/978-3-030-31749-2\_13> 275; Natalie Klein and others, ‘Maritime Autonomous Vehicles: New Frontiers in the Law of the Sea’ (2020) 69(3) International & Comparative Law Quarterly 719, 719. The use of such vessels can also be beneficial from an environmental perspective, since it may be possible for the vessels to operate in more sustainable ways when compared to traditional vessels; Jacobsson (n 1) 275. [↑](#footnote-ref-1)
2. For a further discussion about the future regulatory framework for autonomous vessels, see the chapter by Huiru Liu in this volume. [↑](#footnote-ref-2)
3. The title ’Autonomous Wrecks’ should be read in this light, ie wrecks from autonomous vessels. The wrecks in themselves are thus not presumed autonomous. Instead, they will, most likely, have lost their autonomy as a consequence of being turned into wrecks. [↑](#footnote-ref-3)
4. See eg Robert Veal, Michael Tsimplis, and Andrew Serdy, ‘The legal status and operation of unmanned maritime vehicles’ (2019) 50(1) Ocean Development & International Law 23 ⟨https://doi.org/10.1080/00908320.2018.1502500⟩, 23ff; Klein and others (n 1) 719; Yen-Chiang Chang, Chao Zhang, and Nannan Wang, ‘The international legal status of the unmanned maritime vehicles’ (2020) 113 Marine Policy 103830, 1ff. [↑](#footnote-ref-4)
5. Veal and Tsimplis (n 1) 305; Veal, Tsimplis, and Serdy (n 4) 23; cf Klein and others (n 1) 720. [↑](#footnote-ref-5)
6. Cf Michael N Schmitt and David S Goddard, ‘International law and the military use of unmanned maritime systems’ (2016) 98(902) International Review of the Red Cross 567, 567ff. [↑](#footnote-ref-6)
7. See eg Van Hooydonk (n 1) 403ff; Luci Carey, ‘All Hands off Deck? The Legal Barriers to Autonomous Ships’ (2017) 23(2) Journal of International Maritime Law 202, 202ff; Veal and Tsimplis (n 1) 303; Henrik Ringbom, ‘Regulating Autonomous Ships – Concepts, Challenges and Precedents’ (2019) 50(2–3) Ocean Development & International Law 141, 141ff; Jacobsson (n 1) 274ff. [↑](#footnote-ref-7)
8. There may, however, be vessels that are partially unmanned, ie where there is some manning either permanently or temporarily. These could also be classified as autonomous, to various degrees, depending on the chosen definition; cf Ringbom (n 7) 144f. One example could be an autonomous vessel used for transporting passengers. It would seem plausible that such a vessel has some sort of manning, eg in order to provide services to the passengers or maintaining order on board the vessel; cf Van Hooydonk (n 1) 416. [↑](#footnote-ref-8)
9. See further the discussion in Ringbom (n 7) 142ff. [↑](#footnote-ref-9)
10. Van Hooydonk (n 1) 404; Veal and Tsimplis (n 1) 305f; Veal, Tsimplis, and Serdy (n 4) 24; Jacobsson (n 1) 274. See also Van Hooydonk (n 1) 403f; Jacobsson (n 1) 277 for further distinctions of this kind. [↑](#footnote-ref-10)
11. Veal and Tsimplis (n 1) 306; Jacobsson (n 1) 274. [↑](#footnote-ref-11)
12. Cf Veal and Tsimplis (n 1) 306. [↑](#footnote-ref-12)
13. Veal, Tsimplis, and Serdy (n 4) 24; Jacobsson (n 1) 275. [↑](#footnote-ref-13)
14. Veal and Tsimplis (n 1) 306. [↑](#footnote-ref-14)
15. Veal and Tsimplis (n 1) 304, 306f; Jacobsson (n 1) 275; Klein and others (n 1) 719. [↑](#footnote-ref-15)
16. Charles D Michel, ‘Introductory Note to the Nairobi International Convention on the Removal of Wrecks’ (2007) 46(4) International Legal Materials 694, 694; Richard Shaw, ‘The Nairobi International Removal Convention’ in *cmi Yearbook 2009* (Comité Maritime International 2009) <www.comitemaritime.org/wp-content/uploads/2018/06/YBK\_2009.pdf> accessed 18 September 2020, 402. See also ibid 405ff; Nicholas Gaskell and Craig Forrest, ‘The Wreck Removal Convention 2007’ [2016] Lloyd’s Maritime & Commercial Law Quarterly 49, 52ff; Nicholas Gaskell and Craig Forrest, *The Law of Wreck* (crc Press 2019) 361ff for a detailed description of the development of the convention. [↑](#footnote-ref-16)
17. imo, *Status of multilateral Conventions and instruments in respect of which the International Maritime Organization or the Secretary-General performs depository or other functions* (Comprehensive information on the status of imo treaties including signatories, contracting States, declarations, reservations, statements and amendments, 2022) <wwwcdn.imo.org/localresources/en/About/Conventions/StatusOfConventions/Status%20-%202022.pdf> accessed 11 March 2022, 537f. [↑](#footnote-ref-17)
18. Gaskell and Forrest, *The Law of Wreck* (n 16) 388f. [↑](#footnote-ref-18)
19. Council Document No15859/08 add 1 of 19/17/2008, Statement by the Member States on Maritime Safety; Yvonne Baatz (ed), *Maritime Law* (Taylor and Francis 2014) 267; Ds 2015:16, Avlägsnande av vrak, *(Removal of Wrecks)*, 71. [↑](#footnote-ref-19)
20. For a more thorough discussion, see Shaw (n 16); Gaskell and Forrest, ‘The Wreck Removal Convention 2007’ (n 16); Gaskell and Forrest, *The Law of Wreck* (n 16). [↑](#footnote-ref-20)
21. In this way, the preamble of the convention states that the State parties are ‘[convinced] of the need to adopt uniform international rules and procedures to ensure the prompt and effective removal of wrecks and payment of compensation for the costs therein involved’ and that they recognize ‘the benefits to be gained through uniformity in legal regimes governing responsibility and liability for removal of hazardous wrecks’. [↑](#footnote-ref-21)
22. Gaskell and Forrest, ‘The Wreck Removal Convention 2007’ (n 16) 51f; Gaskell and Forrest, *The Law of Wreck* (n 16) 361. [↑](#footnote-ref-22)
23. Shaw (n 16) 402. [↑](#footnote-ref-23)
24. art 12(1) wrc. [↑](#footnote-ref-24)
25. art 12(1) wrc. [↑](#footnote-ref-25)
26. This can be significant, since it actually may reduce the possible amount that a State can claim in the wake of a wreckage. This can be the result since it means that claims against insurers will not be unlimited even if eg the State in question has opted-out of the possibility to limit liability for wreck removal costs under the llmc; see Gaskell and Forrest, ‘The Wreck Removal Convention 2007’ (n 16) 104f. [↑](#footnote-ref-26)
27. art 12(10) wrc. [↑](#footnote-ref-27)
28. In fact, most wrecks fall outside of the convention if already existing wrecks, historical wrecks and so on are taken into account. The convention is instead focused on ships that suffer maritime casualties today and that turn into wrecks. There are also time limits in place that, in effect, preclude any application on existing wrecks. Even if the time limits could be met, it would not be possible to create liabilities in relation to shipowners for costs incurred before the convention entered into force in the State in question; Gaskell and Forrest, *The Law of Wreck* (n 16) 410. See also art 13 wrc but cf Sarah Dromgoole and Craig Forrest, ‘The Nairobi Wreck Removal Convention 2007 and hazardous historic shipwrecks’ [2011] Lloyd’s Maritime & Commercial Law Quarterly 92 for a potential, although uncertain, application in relation to older wrecks under special circumstances. [↑](#footnote-ref-28)
29. The preamble notes that the State parties are ‘[conscious] of the fact that wrecks, if not removed, may pose a hazard to navigation or the marine environment’. [↑](#footnote-ref-29)
30. art 1(5) wrc. See also art 1(6) wrc for an enumeration of identified related interests. [↑](#footnote-ref-30)
31. art 9(2) wrc. [↑](#footnote-ref-31)
32. art 10(1) wrc. [↑](#footnote-ref-32)
33. art 1(7) wrc. [↑](#footnote-ref-33)
34. Cf Dromgoole and Forrest (n 28) 102. [↑](#footnote-ref-34)
35. Gaskell and Forrest, *The Law of Wreck* (n 16) 406. [↑](#footnote-ref-35)
36. art 1(4) wrc. [↑](#footnote-ref-36)
37. This is an important inclusion, since floating containers can constitute navigational hazards; Gaskell and Forrest, *The Law of Wreck* (n 16) 396. See also Gaskell and Forrest, ‘The Wreck Removal Convention 2007’ (n 16) 78 on how this relates to the duty to report a wreck under the convention. [↑](#footnote-ref-37)
38. Cf Avlägsnande av vrak, *(Removal of Wrecks)* (n 19) 70; Prop 2016/17:178, Skärpt ansvar för fartygsvrak, *(Increased Responsibility for Wrecks)*, 26. [↑](#footnote-ref-38)
39. In this sense, the wrc is designed not to conflict with salvage law and the International Convention on Salvage 1989; Shaw (n 16) 409; Gaskell and Forrest, *The Law of Wreck* (n 16) 396f. See also art 11(2) wrc. [↑](#footnote-ref-39)
40. Shaw (n 16) 409. [↑](#footnote-ref-40)
41. Cf Gaskell and Forrest, ‘The Wreck Removal Convention 2007’ (n 16) 69. [↑](#footnote-ref-41)
42. This State is referred to as the affected State in the convention, see art 1(10) wrc; art 1(1) wrc for a definition of the convention area which is also discussed further below. [↑](#footnote-ref-42)
43. See more in art 5(1) wrc. [↑](#footnote-ref-43)
44. For the criteria that should be taken into account, see art 6 wrc and Gaskell and Forrest, *The Law of Wreck* (n 16) 423f. [↑](#footnote-ref-44)
45. For further details, see art 7–8 wrc. [↑](#footnote-ref-45)
46. See art 9(1) wrc. [↑](#footnote-ref-46)
47. art 9(2) wrc. [↑](#footnote-ref-47)
48. See further art 9(4)–(8) wrc. [↑](#footnote-ref-48)
49. art 10(1) wrc. [↑](#footnote-ref-49)
50. art 12(1) & 12(10) wrc. [↑](#footnote-ref-50)
51. Van Hooydonk (n 1); Veal and Tsimplis (n 1); Veal, Tsimplis, and Serdy (n 4); Klein and others (n 1). There is also, at the time of writing, an ongoing regulatory scoping exercise organized by the imo, that investigates how autonomous vessels can be addressed in imo instruments including the wrc; see Ringbom (n 7) 141f; imo, ‘Autonomous shipping’ (2020) <www.imo.org/en/MediaCentre/HotTopics/Pages/Autonomous-shipping.aspx> accessed 18 September 2020. [↑](#footnote-ref-51)
52. See eg Simon Rainey, ‘What is a ’ship’ under the 1952 Arrest Convention’ [2013] Lloyd’s Maritime & Commercial Law Quarterly 50. [↑](#footnote-ref-52)
53. See further Van Hooydonk (n 1) 406ff, examining the use of the concept in relevant conventions. [↑](#footnote-ref-53)
54. See Veal and Tsimplis (n 1) 308 with further references. This is closely in line with the construction of ship in Swedish law, that also lacks a definition of the concept but where some prerequisites can be inferred indirectly from the legislation. In light of this, a ship in Swedish law has been described as ‘a means of transport equipped to be steered and having a hull supported in the water by enclosed air’, Hugo Tiberg, ‘Wrecks and Wreckage in Swedish Waters’ (2004) 46 Scandinavian Studies in Law 201, 3. See also Van Hooydonk (n 1) 408 for some other, more or less, similar definitions in Dutch, Spanish and Belgian law. [↑](#footnote-ref-54)
55. ibid 406. [↑](#footnote-ref-55)
56. Cf the argument in Jacobsson (n 1) 278. [↑](#footnote-ref-56)
57. Cf Van Hooydonk (n 1) 404; Gaskell and Forrest, *The Law of Wreck* (n 16) 450. [↑](#footnote-ref-57)
58. Veal and Tsimplis (n 1) 309; Chang, Zhang, and Wang (n 4) 2f. [↑](#footnote-ref-58)
59. Art 1(2) wrc. [↑](#footnote-ref-59)
60. Shaw (n 16) 408. [↑](#footnote-ref-60)
61. Gaskell and Forrest, ‘The Wreck Removal Convention 2007’ (n 16) 70; Gaskell and Forrest, *The Law of Wreck* (n 16) 448. [↑](#footnote-ref-61)
62. Cf also ibid 450, that touches upon the subject and states that the mere fact that a ship is autonomous should not prevent it from falling under the convention. [↑](#footnote-ref-62)
63. Gaskell and Forrest have called the inclusion of the term seagoing as unfortunate since ‘it is inherently unclear what it means’, Gaskell and Forrest, *The Law of Wreck* (n 16) 449. [↑](#footnote-ref-63)
64. See Gotthard Gauci, ‘The International Convention on the Removal of Wrecks 2007 – a flawed instrument?’ [2009] Journal of Business Law 203, 206; Gaskell and Forrest, ‘The Wreck Removal Convention 2007’ (n 16) 70, where this is argued. [↑](#footnote-ref-64)
65. Cf Gaskell and Forrest, *The Law of Wreck* (n 16) 449. [↑](#footnote-ref-65)
66. As an example, it has been suggested that early variations of autonomous vessels, because of their relatively small size, are likely to be used in inland waters; cf Jacobsson (n 1) 275. [↑](#footnote-ref-66)
67. Cf Gaskell and Forrest, *The Law of Wreck* (n 16) 449 for the position in English law. [↑](#footnote-ref-67)
68. Cf Avlägsnande av vrak, *(Removal of Wrecks)* (n 19) 56. [↑](#footnote-ref-68)
69. Instead, the implementation avoids giving a definition of a ship. The relevant provision only states that apart from ships, without any provided definition, the regulation is also applicable in relation to other craft used at sea along with floating platforms except when such platforms are on location engaged in the exploration, exploitation or production of seabed mineral resources; see Chapter 11 a § 1 Swedish Maritime Code. The phrasing in Swedish does not suggest that a requirement of being seagoing is to be inferred also on ships. [↑](#footnote-ref-69)
70. Cf Skärpt ansvar för fartygsvrak, *(Increased Responsibility for Wrecks)* (n 38) 25ff. [↑](#footnote-ref-70)
71. It is argued, in the preparatory works, that the convention primarily was developed for ocean-going transport, but that it poses no problem to apply the framework, including the compulsory insurance, also on ships operating in other areas, eg in inland lakes; ibid 28f. Arguably, there may, however, be problems with this wide scope of application that seems to go beyond the intended scope of the convention; cf art 10(3) wrc stating that no claims for the costs regulated in the convention can be made against a registered shipowner otherwise than in accordance with the provisions of the convention and that this is relevant also to States that have extended the convention’s scope of application when it comes to costs associated with locating, marking and removing wrecks in accordance with the convention. There may also be good reason to pay attention to the international nature of the convention when implementing, interpreting and applying its provisions, cf Gaskell and Forrest, *The Law of Wreck* (n 16) 449f. One of the purposes of the convention, stated in the preamble, is, after all, to harmonize this field of law between State parties. To avoid the concept seagoing in the convention altogether, as in the Swedish implementation, and to extend the convention in the described way, may sit uneasily with this position. This issue will, however, not be elaborated further in this context. [↑](#footnote-ref-71)
72. As discussed earlier, this is one of the possible uses of autonomous vessels; cf Veal and Tsimplis (n 1) 305. [↑](#footnote-ref-72)
73. art 1(4)(b)–(c) wrc. [↑](#footnote-ref-73)
74. Cf Gaskell and Forrest, *The Law of Wreck* (n 16) 450. [↑](#footnote-ref-74)
75. art 1(4); art 10(1) wrc. [↑](#footnote-ref-75)
76. This was the result of a compromise at a late stage in the development of the convention. There had been different suggestions on the convention’s scope of application, where some States wanted a broad scope of application, while others were in favour of a more restricted scope. The compromise enables States to affect the geographical scope of application by allowing them to opt-in to an extended application. See Gaskell and Forrest, ‘The Wreck Removal Convention 2007’ (n 16) 108ff on this development. [↑](#footnote-ref-76)
77. art 1(1); art 3(1) wrc. [↑](#footnote-ref-77)
78. Jacobsson (n 1) 275. [↑](#footnote-ref-78)
79. Gauci (n 64) 211; Gaskell and Forrest, ‘The Wreck Removal Convention 2007’ (n 16) 107. [↑](#footnote-ref-79)
80. art 3(2) wrc. [↑](#footnote-ref-80)
81. Cf art 1(1); art 2(4); art 3(1) wrc. One potential exception to this, however, would be a State that has not declared or established an exclusive economic zone. In such a case, the convention area, as defined in art 1(1) of the convention, is still ‘an area beyond and adjacent to the territorial sea of that State determined by that State in accordance with international law and extending not more than 200 nautical miles from the baselines from which the breadth of its territorial sea is measured’. In this way, the convention would in fact be applicable on the high seas and thus on potential autonomous vessels that operate there. See also Dromgoole and Forrest (n 28) 99; Gaskell and Forrest, *The Law of Wreck* (n 16) 409. [↑](#footnote-ref-81)
82. art 5 wrc. [↑](#footnote-ref-82)
83. art 1(9); art 5(1) wrc. [↑](#footnote-ref-83)
84. Cf Van Hooydonk (n 1) 414. [↑](#footnote-ref-84)
85. art 12(1) wrc. [↑](#footnote-ref-85)
86. art 12(10) wrc. [↑](#footnote-ref-86)
87. Cf Gaskell and Forrest, ‘The Wreck Removal Convention 2007’ (n 16) 50. [↑](#footnote-ref-87)
88. art 12(5) wrc. [↑](#footnote-ref-88)
89. Cf Van Hooydonk (n 1) 415. [↑](#footnote-ref-89)
90. art 12(5) wrc. [↑](#footnote-ref-90)
91. art 4(2) wrc. [↑](#footnote-ref-91)
92. Van Hooydonk (n 1) 404; Jacobsson (n 1) 274f. [↑](#footnote-ref-92)
93. See further Klein and others (n 1) 723f on the relation between autonomous vessels and the definition of warships in unclos, suggesting that the demands for such a vessel to be ‘under the command of an officer’ as well as ‘manned by a crew’ can be fulfilled in relation to autonomous vessels as well. [↑](#footnote-ref-93)
94. ibid 719. [↑](#footnote-ref-94)
95. See Van Hooydonk (n 1) 404; Veal, Tsimplis, and Serdy (n 4) 24. See also Schmitt and Goddard (n 6). [↑](#footnote-ref-95)
96. art 4(2) wrc. [↑](#footnote-ref-96)
97. art 4(2)-(3) wrc. [↑](#footnote-ref-97)