

Autonomous Ships and the Law

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1. Ship automation and the neglected maritime security dimension

What was but a futuristic scenario barely a decade ago is increasingly becoming a reality: autonomous ships¹ cruising the oceans. Successful trials, tests, and operation of this emerging technology in the civilian shipping world are being announced regularly and at ever shorter intervals.² The question, therefore, is no longer whether the turn to automation in shipping takes place, but rather at what pace and in what form it will occur. The view that autonomous ships are not “technologies of passing interest”³ receives strong support from the fact that the International Maritime Organization (IMO) has invested significant resources in better understanding the legal implications of Maritime Autonomous Surface Ships (MASS) through a Regulatory Scoping Exercise (RSE). The exercise is not only comprehensive, with more than 30 IMO treaties being analyzed with a view to their applicability and continued relevance for MASS operations,⁴ but also highly proactive⁵ and conducted at a fast pace.⁶ What is more, the IMO has already issued “Interim Guidelines for MASS Trials,” which aim to ensure that experiments with autonomous ships and the related infrastructure “are conducted safely, securely and with due regard for protection of the environment.”⁷

Yet as reports about the beneficial applications of autonomous technology at sea become more common, headlines testifying to their malicious use have also multiplied. Among the most widely-reported incidents figure the attacks by Houthi rebels with remote-controlled, explosive-laden boats against merchant ships, warships, and installations in the Red Sea, that started in early 2017 and are ongoing.⁸ These attacks provide impressive evidence that criminals have already started embracing this new technology in order to compromise maritime security, and there is a very real chance that they will do so with increasing frequency and in a variety of ways in the future.⁹ But the advent of autonomous ships is relevant for maritime security beyond their potential use to commit crimes at sea – as offender ships – in at least two respects. First, port state authorities, coast guards, and navies have

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started to rely on autonomous technology to enforce the law at sea.¹⁰ So far, autonomous systems have been mainly used in support of traditional enforcement vessels;¹¹ yet with full-fledged autonomous enforcement vessels recently appearing on the market,¹² their independent use is looming on the horizon. Second, autonomous merchant ships may become the prey of criminals, whereby a main concern is that they fall victim of cyber-attacks.¹³

These three dimensions of autonomy and maritime security – autonomous ships used to commit offences at sea, deployed for law enforcement purposes and as potential victims of crime – provide an analytical lens for the legal analysis of maritime security-related provisions. The differentiation between victim craft, offender craft, and enforcer craft is useful, and even necessary, because of the distinct legal issues and questions that arise in the three contexts. For example, the requirements that a craft must fulfill in order to qualify as an enforcement ship are rather stringent,¹⁴ while the threshold for being a victim ship is generally quite low. Moreover, the drivers behind the aim of addressing increased automation in shipping also differ between these three categories of ships involved in maritime security incidents. It is, for instance, often argued that legal obstacles could hamper the rapid introduction and widespread use of this emerging technology for law enforcement purposes.¹⁵ By contrast, as regards the use of autonomous ships to commit maritime crimes, the main impetus for keeping the legal framework abreast of technological change is needing to have a sufficient legal basis for enforcement action and potential criminal prosecution – both of which are necessary to comply with the rule of law.

Despite the rather obvious maritime security dimension of increased automation in shipping, the related doctrinal discussion is still in its infancy. While there is already a significant number of publications on the use of autonomous ships in the civilian shipping world¹⁶ or in situations governed by the law of armed conflicts,¹⁷ their “potential use (and abuse)” with regard to maritime security has received little scholarly attention thus far.¹⁸ In terms of policy and regulatory discussions, it is true that the IMO RSE extends to the four SUA instruments,¹⁹ which address maritime terrorism and non-proliferation of weapons of mass destruction at sea – and thus maritime security. Yet, as we will see later,²⁰ the methodology developed for the IMO’s exercise is heavily geared toward treaties falling within the more “classical” topics dealt with by the organization, that is, maritime safety, prevention of marine pollution, as well as liability and compensation.²¹ The RSE nonetheless produces useful insights and raises awareness amongst governments that increased automation in shipping cannot be accommodated without further ado within the existing maritime security legal framework,²² even though it arguably does not have a disruptive effect on the framework.²³

The present chapter is a contribution to scholarship on automation in shipping and maritime security; its focus is on autonomous offender ships and whether they fit under select maritime security provisions of

UNCLOS²⁴ and the SUA Conventions.²⁵ By relying on the key terms and concepts proposed in chapter 2 of this book, it first discusses the autonomous technology that criminals currently rely on when committing harmful acts at sea; it then carves out the main difference between the commission of maritime crimes by traditional and autonomous offender ships. This will reveal that, at present, criminals predominantly use remote-controlled, explosive-laden ships without any on-board crew to wreak havoc at sea. The scenario lends itself well to an analysis of whether these acts amount to piracy as defined in article 101 of UNCLOS. Moreover, it allows for an assessment of whether the 1988 and 2005 SUA Conventions, respectively, are fit for purpose or whether its offences need to be amended in order to accommodate the use of ships not carrying a crew to endanger the safety of navigation. The chapter concludes by emphasizing the need for a common understanding on the applicability and continued relevance of the international maritime security legal framework, in light of the fact that non-state actors increasingly turn to autonomous ships to victimize other ships.

2. The commission of crimes through autonomous ships

2.1. *Autonomous offender ships: elements of ship automation*

Terms and concepts denoting emerging technologies that allow for increased automation in shipping are not (yet) consolidated.²⁶ In light of the “significant terminological confusion,” this book begins with a chapter defining key terms and concepts.²⁷ The authors suggest distinguishing between three different – but intrinsically linked – elements of ship automation: technical capability, autonomy, and manning.²⁸

The first element, technical capability, is a placeholder for a ship’s capacity to rely on two types of emerging shipping technologies: remote operability and intelligence.²⁹ The former refers to a ship’s technical capability to be monitored and controlled remotely by a human operator, be it from another ship or from shore.³⁰ Intelligence, in turn, is here understood as being the “system’s ability to accomplish complex goals;”³¹ intelligent shipboard systems are thus, broadly speaking, systems capable of performing certain, increasingly complex, tasks that commonly require human intelligence and today are predominantly performed by humans.³² The second element, autonomy, refers to the system’s independence from its users.³³ A system possesses autonomy if it fulfills two conditions: firstly, it must possess the “technical capability to make decisions on its own” and, secondly, it “must have a possibility to implement those decisions on its own.”³⁴ Thereby, the *scope* of autonomy refers to “the range of tasks where a system can act autonomously,”³⁵ such as navigation, communication, or mooring and cargo handling;³⁶ while the *level* of autonomy describes “how independently a system may perform a specific task.”³⁷

This begs the question of what type of ships criminals rely on in order to commit maritime crimes: What is their technical capability and what tasks can they perform independently from the perpetrator? In early 2017, an initial attack carried out by Houthi rebels with a remote-controlled craft filled with explosives was reported: the assault was directed against the Saudi frigate *Al Madinah*, which resulted in hull damage and the death of two Saudi sailors.³⁸ This was the beginning of a series of bombings that victimized targets in the Red Sea, ranging from merchant ships to infrastructure.³⁹ Other attacks using “drone boats” were foiled by naval forces,⁴⁰ including one against an oil tanker, which could have produced large secondary explosions resulting in major environmental and other types of harm.⁴¹ A common hallmark of these attacks is the use of ordinary speed boats retrofitted with remote-technology⁴² and loaded with explosives.⁴³ The rigged boats were usually civilian pleasure boats;⁴⁴ in one instance, a converted patrol boat was used, specifically a former UAE Coast Guard boat that had initially been donated to Yemeni government forces and ultimately fell into the hands of the Houthi rebels.⁴⁵ The *modus operandi* of terrorists at sea is – from a technological point of view – similar to that of the so-called Islamic State on land, where its supporters relied on off-the-shelf aerial drones that they mounted with explosive devices to launch potentially deadly attacks against persons in Iraq and Syria.⁴⁶ The smuggling of narcotics or other illicit cargo is another malicious use of remote-controlled ships,⁴⁷ which is – to the extent publicly known – so far only practiced at a low level.⁴⁸

From this accrues that, thus far, criminals have primarily had recourse to remote-controlled boats to cause harm at sea or to transport illicit cargo – at least in terms of publicly reported incidents.⁴⁹ Intelligent technology, by contrast, has seemingly not been widely used yet; this may change, however, with its further development, commercialization, and “democratisation.”⁵⁰ The scope and level of autonomy (as defined in this book⁵¹) of the remote-controlled ships used so far for the mentioned malicious purposes tends toward zero, since decisions relating to key tasks – navigation and delivering the explosive payload – continue to be taken and implemented by human beings.⁵² Whether perpetrators remotely monitoring and controlling the offender ship act from shore or from other ships is not apparent from the often brief public reports and news.⁵³ Yet, what can be asserted is that remote operability of the ships usually extends to all of the vessel’s key systems,⁵⁴ which implies – and this is a game-changer – that no on-board crew is necessary.

This brings us to the third and last element of ship automation identified in chapter 2 of this book: manning. The term refers to the availability of competent persons to operate a ship, which may be located either on board the ship (“on-board crew”) and/or in a remote operation location (“remote crew”).⁵⁵ As a general rule, a ship’s technical capability does not determine the level of manning; for example, a ship may display full remote

operability and still rely on a full on-board crew.⁵⁶ Yet, in cases where this new technology is used for malicious purposes, there will generally be *no* on-board crew – for the simple reason that one of the main drivers for relying on autonomous ships to commit crimes at sea is to minimize the perpetrator’s risks.

Indeed, the use of remote-controlled boats with no on-board crew drastically tips the risk ratio of criminal endeavors in the perpetrator’s favor. First of all, it considerably reduces the costs of such endeavors.⁵⁷ More importantly, relying on autonomous offender ships to cause physical harm provides ample distance from the actual scene of the crime, which, in turn, minimizes the perpetrator’s risk of being killed,⁵⁸ injured, or arrested. Since arrest at sea is not possible in the absence of an on-board crew, the likelihood of arrested suspects disclosing crucial information about the criminal operation or network in return for a plea bargain decreases too.⁵⁹ Overall, the use of autonomous technology to commit crimes allows for distance and anonymity, which complicate the attribution of criminal conduct,⁶⁰ while increasing the potential readiness of persons to engage in illicit conduct.⁶¹

Building a remote-controlled boat requires certain technical skills. By contrast, even a “moderately talented person” can guide it toward a target,⁶² different from anti-ship missiles, the launch of which requires trained operators.⁶³ Autonomous technology thus endows “low-skill individuals with previously high-skill attack capabilities.”⁶⁴ At the same time, the efficiency of attacks with remote-controlled boats is high, since they are generally difficult to detect, notably due to their civilian apparel,⁶⁵ the material with which they are built, their speed, and the fact that they run close to the surface.⁶⁶ Moreover, if equipped with a powerful engine and rigged with explosives, they feature “serious striking power,”⁶⁷ and the fact that they can be operated in swarms⁶⁸ or team up with traditional ships used to commit offence at sea⁶⁹ also has a leveraging effect. Overall, autonomous ships provide persons intent on compromising maritime security with a highly advantageous, affordable, and increasingly accessible means for engaging in maritime crime. Worryingly, the “gap between attack capabilities and defense capabilities”⁷⁰ is expected to grow in the near future – despite the relatively simple technology⁷¹ used on the side of perpetrators.⁷²

2.2. The assumption of an on-board crew: thrown overboard

This brief account demonstrates that offenders currently use remote-controlled, rather than intelligent, ships to commit crimes at sea. Further, as regards their key tasks, which are navigation and, with regard to some offences, delivering an explosive payload, the offender ships do not feature any autonomy as defined in this book.⁷³ Overall, the technology relied on has not taken such a giant leap since 1898, when scientist Nikola Tesla maneuvered a tiny, remote-controlled boat on New York’s Madison Square Garden pond, flashing its running lights on and off. Interestingly, already

back then the remote-controlled boat, which was later patented, was “decried as magic by some,” while others were concerned about “its potential as a weapon.”⁷⁴ True, present-day examples of offender ships are technologically more advanced; but considering the full spectrum of existing and anticipated ship automation technology, they are still relatively rudimentary – we are still at the “horseless carriage” stage of this emerging technology.

Yet, for a great number of international law of the sea and maritime law provisions, this relatively modest technological step ahead suffices to raise questions as to their continued applicability and relevance. So far, these norms have “proved flexible enough to accommodate technological developments, from sail to steam to containerisation.”⁷⁵ Though it cannot be ignored that all past developments have aligned well with the premise on which the international law of the sea and international maritime law rest: the presence of an on-board crew.⁷⁶ The example of piracy, the most densely regulated crime of UNCLOS, illustrates this underlying assumption quite well. The definition of the offence, for example, suggests the presence of persons on board the offender craft when stating that the piratical act must be “committed [...] by the crew or passengers of a private ship” against another ship on the high seas.⁷⁷ The most compelling enforcement measure – the arrest of piracy suspects – is only available against “persons [...] on board” the seized pirate ship and is, furthermore, geographically limited to “the high seas.”⁷⁸ Finally, the phrase that “[t]he courts of the State which carried out the seizure may decide upon the penalties to be imposed,”⁷⁹ which pertains to adjudicative jurisdiction, equally rests on the assumption that the offender is on board the seized craft.

Remote-controlled boats without on-board crew, let alone crewless intelligent ships, no longer satisfy the assumption of presence. Their use entails a shift from proximity to remoteness as regards the offender’s involvement. If perpetrators rely on remote-controlled crafts, they are involved in real-time, but act at a distance from where the harmful act unfolds – be it from dry land or from a ship or platform at sea. If, in the future, offenders rely on intelligent systems featuring a certain level of autonomy with respect to key tasks, their involvement will be remote in terms of both time and geography. The perpetrator will launch the system and take action from a location far from where the harmful act occurs. Moreover, a considerable amount of time may elapse between the instant a system with high endurance and reach is dispatched and the moment it causes harm at sea.

Overall, we do not need to wait for vanguard technology to be used to commit maritime crimes in order to shake the foundations of international maritime security law.⁸⁰ Rather, in order to raise intricate interpretational questions, it seems to suffice that the assumption of an on-board crew is thrown overboard, which is already the case when offenders rely on remote-controlled boats not carrying any crew.

3. The commission of piracy through autonomous offender ships

3.1. *Interpretation: leaning toward a restrictive approach*

The increased use of remote-controlled crafts without on-board crew by non-state actors to victimize other ships, including persons on board, notably begs the question whether this amounts to piracy, which is defined in UNCLOS article 101(a)(i) as:

any illegal acts of violence or detention, or any act of depredation, committed for private ends by the crew or the passengers of a private ship or a private aircraft, and directed [...] on the high seas, against another ship or aircraft, or against persons or property on board such ship or aircraft.⁸¹

The answer largely depends on the interpretative approach taken. Quite commonly, commentators argue for a constructive⁸² or evolutionary interpretation⁸³ of provisions of the international law of the sea and maritime law, in order to keep them abreast of change. Indeed, these modes of interpretation greatly facilitate the task of seamlessly accommodating autonomous ships within the existing legal framework. But they may be inapposite for the interpretation of provisions of international maritime security law, many of which are a blend of the international law of the sea and criminal law. Thus, the definition of piracy is a composite of elements deriving from the law of the sea (such as the reference to the “high seas,” which is a maritime zone defined under the law of the sea) and elements originally stemming from criminal law (such as the reference to “any act of inciting or intentionally facilitating”).⁸⁴ The offence definitions found in the 1988 and 2005 SUA Conventions⁸⁵ equally feature a markedly criminal law trait. Despite the panoply of methods proposed for statutory interpretation, the interpretation of criminal statutes specifically is subject to a widely recognized constraint: the principle of legality, which flows from the rule of law,⁸⁶ and which curtails the interpretative space considerably and prohibits analogies altogether.⁸⁷ In sum, the intradisciplinary nature of provisions governing maritime crimes suggests respecting the principle of legality – and the broader rule of law – in the interpretative process and opting for a rather restrictive approach towards interpretation.⁸⁸

This can be done by applying the fairly elastic “crucible approach” enshrined in article 31 of the VCLT⁸⁹ where the text, object and purpose, as well as the context, are “thrown into the crucible and their interaction would then give the legally relevant interpretation.”⁹⁰ First of all, this is because systematic integration, as provided for in article 31(3)(c) of the VCLT,⁹¹ allows for the general principles underlying criminal law to be leveraged, that is, the rule of law and the principle of legality. Secondly, we

will see that an object and purpose-based interpretation equally gives effect to the rule of law as UNCLOS aims at “providing a stable jurisdictional framework and the consolidation of the rule of law at sea.”⁹² Neither the rule of law nor the principle of legality is absolute, rather they are gradual concepts aimed at maximizing certainty and minimizing arbitrariness.⁹³ Hence, observing these principles in the interpretative process does not imply that there is no interpretive space at all when discerning the meaning of provisions defining maritime crimes, but suggests that a certain degree of restraint be applied.

The following analysis of the piracy definition in light of increased automation in shipping concentrates on the relatively straightforward scenario where a single remote-controlled craft not carrying a crew is used to cause havoc at sea – the *modus operandi* routinely chosen by Houthi rebels for their naval attacks in the Red Sea.⁹⁴ Occasionally, it will call into play the situation where several remote-controlled ships are launched to operate in concert, or where remote-controlled boats without on-board crew team up with a traditional offender ship.

3.2. “Ship”: a generic notion accommodating technological change

Since UNCLOS article 101(a)(i) requires that piracy be committed by “a private ship [...] against another ship,” the first interpretational question is whether remote-controlled crafts qualify as “ships.” Despite its heavy reliance on the notions of “ship” and “vessel,” UNCLOS does not define these terms – and for good reason. The term “ship” is not amenable to a single definition, but rather depends on the subject matter and context of the rules in which it appears. Since UNCLOS aspires to regulate “all issues relating to the law of the sea,”⁹⁵ a single definition is neither possible nor helpful.⁹⁶ Consequently, it is necessary to discern the meaning of the term for the definition of piracy specifically and, moreover, to distinguish between the victim and the offender craft.⁹⁷

As regards the offender ship, a look into previous norms and related *travaux* is revealing. Interestingly, the authors of the Harvard Draft Convention of 1932, out of concern to have “a *single* term to indicate all the various means of transportation by sea *or* air which may be involved in piratical enterprises,”⁹⁸ opted for a comprehensive definition. Accordingly, article 5 of the Harvard Draft Convention stipulates: “The term ‘ship’ means any water craft or air craft of whatever size.”⁹⁹ Their term of choice was “ship” – even though it denotes both water *and* airborne crafts – for it “is the natural word to select for the purpose, since the pirates of history and fiction commonly used ships and the pirate ship and the pirate are associated in one’s mind much as are the Cossack and his horse.”¹⁰⁰ The International Law Commission (ILC) ultimately abandoned this approach and their definition of piracy refers to “ship” and “aircraft” separately;¹⁰¹

as do the definitions of the 1958 Convention on the High Seas¹⁰² and UNCLOS. With this, the term “ship” used in contemporary provisions on piracy no longer has a special meaning,¹⁰³ that is, one that includes aircrafts.

However, from the discussions within the ILC, we can infer that they understood the reference to offender crafts to be a generic term, the content of which they “expected would change through time.”¹⁰⁴ For example, in response to the proposal that attacks by aircraft against vessels be explicitly included in the definition, the Special Rapporteur noted that “in the interest of simplification [...] he had originally followed the Harvard draft in order to take modern technological developments into account.”¹⁰⁵ Similarly, one of the members advocated against a “restrictive conception of piracy,” since it may be easier for persons intent on committing piracy to obtain an aircraft than a ship; the same member urged the ILC to “take technical progress into account, and, in particular, the consequent possibility of flying-boats committing acts of piracy.”¹⁰⁶ The drafters of the 1958 Convention on the High Seas relied heavily on the definition of piracy contained in the ILC draft;¹⁰⁷ and those of UNCLOS essentially copied the piracy definition from the 1958 Convention on the High Seas. As a result, the notion of “ship” remains a generic concept throughout the various non-binding and binding rules – which is of importance for their interpretation. While the general intertemporal rule requires that the interpreter give terms the meaning they had at the time the treaty was adopted, an exception exists for generic terms: it must be presumed that the parties intended these terms to be given their meaning in light of the circumstances prevailing at the time of interpretation.¹⁰⁸ This implies that the generic term “ship” is interpreted in light of present-day conditions, which makes it perfectly apt to accommodate new technologies, such as remote-controlled boats. All the more so as the autonomous offender crafts used thus far to compromise maritime security have been retrofitted traditional boats.¹⁰⁹ It does not seem that the move from on-board to remote-controlled technology is such that it cannot qualify any longer as a “ship” in the sense of the piracy definition – especially against the background that traditional boats used to engage in piracy are considered “ships” in the sense of UNCLOS article 101(a)(i), irrespective of their size and technical capabilities.¹¹⁰

To determine conclusively whether a remote-controlled boat qualifies as a “ship” in the sense of UNCLOS article 101(a)(i), it is further necessary to consider the context in which the term appears. The International Court of Justice has held that a:

word obtains its meaning from the context in which it is used. If the context requires a meaning which connotes a wide choice, it must be construed accordingly, just as it must be given a restrictive meaning if the context in which it is used so requires.¹¹¹

As regards ocean-going devices used to commit piratical acts, the decisive criterion appears to be whether they are capable of interfering with navigation on the high seas or in the exclusive economic zone (EEZ)¹¹² in a way described in UNCLOS article 101(a)(i). This is a low threshold, requiring nothing more than the capacity to navigate in these maritime zones and to engage in an act of violence, depredation, or detention¹¹³ – all of which remote-controlled boats of the type used by Houthi rebels, for example, are already capable of doing today. The context thus suggests a wide interpretation of the term “ship,” which – overall – must be read in a way that encompasses remote-controlled offender crafts.

3.3. Commission by the “crew”: the greatest interpretational hurdle

The technical capability of a ship – which encompasses its capacity to be monitored and controlled remotely – is, conceptually speaking, unrelated to the question of manning.¹¹⁴ Yet, we have seen that autonomous offender ships will routinely operate without on-board crew, as it is this specific feature that provides perpetrators with a competitive edge.¹¹⁵ It is the very absence of an on-board crew that triggers the arguably most intricate interpretational question, namely whether the requirement that the act of violence, depredation, or detention must be “committed [...] by the crew or the passengers” of a private ship encompasses the scenario where a remote, rather than on-board, crew monitors and controls the offender ship.

It could be argued that UNCLOS was adopted in 1982 and thus at a time when the drafters could have already assumed that, in the near future, crew functions could be performed by persons not physically present on board. In other words, that the notion of “crew” was always meant to cover both on-board and remote crews. Yet Wood seems correct when writing that “[a]ge is relative” and the statement that UNCLOS dates from 1982 “is perhaps an oversimplification” because “many of its provisions are much older.”¹¹⁶ This certainly holds true for the definition of piracy, which has neither been substantially changed nor discussed since its inclusion in the 1956 ILC Draft, which was, in turn, borrowed in large part from the 1932 Harvard Draft Convention.¹¹⁷ The definition of piracy is thus, materially speaking, fairly old and the notion of “crew” was not revamped when UNCLOS was adopted in the early 1980s. Different from the term “ship,” where the drafters anticipated technical developments (such as flying boats¹¹⁸) and addressed them by opting for a generic term, they arguably did not foresee that ships could one day cruise the oceans without any on-board crews.

Such a reading receives support from the fact that the term “crew” is mentioned together with the word “passenger,” which can be defined as “[a] traveller on a public or private conveyance other than the driver, pilot, or crew.”¹¹⁹ In order to travel, one must necessarily be on board a craft. On

the other hand, and this advocates against a narrow construction, the explicit reference in UNCLOS article 101(a)(i) to persons “on board” solely appears in the context of the victim ship. This textual difference between the description of the offender and victim crafts seems to allow for the argument that the notion of “crew” also covers remote crew of an offender ship. Further, throughout the discussions about the meaning of “ship” in the definition of piracy, there was agreement that the term encompasses any kind of future technical development. It would go against this functional understanding of the term “ship” – as an ocean-going device capable of being used to attack other ships – if the notion of “crew” were frozen in time. If this were the case and only on-board controlled crafts qualified as ships, the term “ship” would – contrary to the drafters’ intent – not be capable of keeping pace with technical progress. Overall, one can conclude that neither the wording nor the context of the definition of piracy seem to preclude *per se* that a person controlling a craft remotely can be considered “crew” and the system a “ship.”

We now turn to a purpose and object-bound interpretation of the piracy provision and systemic integration, which are interpretative methods allowing the rule of law and principle of legality – principles of primordial importance in the context of maritime security – to be leveraged.¹²⁰ To identify a single object and purpose of UNCLOS, which is characterized by its thematic comprehensiveness, is challenging. The fact that the treaty constitutes a package deal – and is thus the result of a delicate balancing of competing interests – precludes the singling out of one substantive (key) issue and understanding it as representative of its entire object and purpose.¹²¹ Rather than being subject-specific, the object and purpose of UNCLOS is broader in nature. Concretely, it “promotes the rule of law at sea by allocating authority to govern and by imposing qualifications on that authority in different situations.”¹²² Interestingly enough, Oxman opined that

[t]he law of piracy is perhaps the best known example of the attempt to extend the rule of law to the sea. What is too rarely understood about the law of piracy is that most of its rules are designed to refine and circumscribe the universal enforcement and adjudicative jurisdiction it confers. The objective is to create just enough universal jurisdiction to respond to the practical problem posed by murder and mayhem on the high seas, but not so much as to threaten random violence or unwarranted interference with freedom of navigation and the liberty interests associated with that freedom.¹²³

From this accrues that the definition of piracy in UNCLOS has a limitative, and thus protective, function, by clearly delimiting the conduct for which universal enforcement powers are available and for which a person can be prosecuted and punished. If construed too broadly, it fails to perform this

function and, consequently, cannot live up to the object and purpose of UNCLOS.¹²⁴ It is against this background that the interpreter must decide whether the word “crew” encompasses persons acting from a location other than the offender ship. To do so, it seems appropriate to distinguish between two functions that the definition of piracy under article 101 of UNCLOS is said to perform: to provide a legal basis authorizing the taking of enforcement measures; and, if we agree that the definition amounts to an international crime, to serve as a basis for domestic criminal prosecutions.¹²⁵

The first, uncontested, function of the piracy definition – to delimit the scope of enforcement measures – is a concrete manifestation of a core aspect of the rule of law: that the “power of the State may not be exercised arbitrarily,” but rather only through laws that are “prospective, accessible and clear.”¹²⁶ The definition of piracy contained in UNCLOS article 101, read together with articles 110 (right of visit) and 105 (seizure of a pirate ship), respectively, are certainly prospective and accessible legal bases. Whether they meet the clarity requirement if “crew” is interpreted in such a way as to include remote crews is less clear. A ship can be visited if “reasonable ground for suspecting” that it engages in piracy exists.¹²⁷ At that very moment it will often not yet be possible to ascertain whether the ship carries an on-board crew. All the more so as the autonomous offender crafts currently used are repurposed traditional ships, which may not be readily identified as being without any on-board crew.¹²⁸ Hence, in the context of the right of visit, it seems compatible with the rule of law to interpret “crew” in a way that covers remote crews. As regards UNCLOS article 105, the legal basis for the arrest of persons on board a ship identified as pirate ship,¹²⁹ systemic integration entails reading the provision in light of the right to liberty, which equally requires an accessible, precise, and foreseeable legal basis.¹³⁰ An arrest based on this provision is, however, only possible on the high seas and in the EEZ,¹³¹ not on dry land or within waters subject to the sovereignty of a state. If the remote crew acts from the high seas or the EEZ, it will generally do so from on board a ship,¹³² which itself qualifies as pirate ship (similar to a mother ship used in the context of traditional piracy). From this follows that for the most intrusive enforcement measure – deprivation of liberty – the question whether the word “crew” comprises a remote crew is of very little practical relevance. Moreover, in addition to arrest, UNCLOS article 105 allows for the seizure of a pirate ship and the property on board. With regard to these latter measures, it is tenable to interpret “crew” as encompassing remote crew, as the rule of law requirements seem less stringent if measures are directed towards property rather than persons. Based on such an, admittedly result-based, interpretation it seems possible to understand the word “crew” in a way as to include on-board and remote crews.

As regards the role that UNCLOS article 101(a)(i) plays in criminal prosecutions, some authors have suggested that the provision amounts to an international crime, based on which a suspect may be prosecuted

domestically.¹³³ By virtue of international law, municipal criminal courts are bound by the “full-fledged” principle of legality, rather than just its “core” content applying at the international level.¹³⁴ As regards offence definitions specifically, the principle of legality in most jurisdictions entails the principle of certainty and prohibits the creation of offences by analogy.¹³⁵ This implies that offences must be clearly defined, thereby “placing the individual in a position where they know or are reasonably able to discover which acts or omissions will make them criminally liable.”¹³⁶ Whether the qualification of a remote crew as “crew” in the sense of UNCLOS article 101(a)(i) lives up to this standard is a borderline case, the decision on which ultimately depends on the exact understanding of the principle of legality in the jurisdiction where the criminal proceedings take place. Other authors argue that domestic prosecutions cannot be directly based on UNCLOS article 101(a)(i), but only on domestic criminal provisions.¹³⁷ Ideally, these domestic criminal norms are amended in such a way as to explicitly encompass remote crews – an endeavor easier to achieve at the municipal than at the international level. Overall, an interpretation in light of the object and purpose of UNCLOS and international human rights law also seems to allow for the term “crew” to be read as encompassing remote crew – except, arguably, for the situation where domestic criminal prosecutions are directly based on the definition of piracy under UNCLOS.

3.4. Act of violence, detention, or depredation: today and in the future

As a last step we now turn to the conduct that amounts to piracy. As per UNCLOS article 101(a)(i), piracy can be committed, alternatively,¹³⁸ through an act of violence, detention, or depredation; the latter term is usually defined as plunder, pillage, or robbery.¹³⁹ Contemporary traditional piracy mostly occurs in the forms of detention and depredation, while acts of violence are generally solely committed in order to achieve the ultimate goal of taking control of the ship and crew or to commit property offences.¹⁴⁰ By contrast, remote-controlled offender ships without on-board crew have so far primarily been used for attacks, the very purpose of which has been to inflict violence upon the victim ship, specifically to cause damage or destruction through an explosion.¹⁴¹ Since a single act¹⁴² causing relatively little harm – such as a sole shot fired upon a ship – qualifies as an act of violence in the sense of UNCLOS article 101(a)(i),¹⁴³ naval attacks in the style of those carried out by Houthi rebels in the Red Sea over the last three years¹⁴⁴ clearly fulfill the conduct element of the offence.

According to UNCLOS article 101(a)(i), piracy can also be committed through an act of detention. Once the swarming capabilities of autonomous offender crafts are further developed,¹⁴⁵ it seems possible that a plurality of them could bring a victim ship under the perpetrator’s control. Already

today, remote-controlled ships, which are armed or loaded with explosives, could arguably bring a victim ship under control such that it is no longer free to move at will – and, therefore, must be considered detained. The argument that persons on board the victim ship would not necessarily be deprived of their liberty can be dismissed, as the wording lists the detention of ships and persons as alternatives.¹⁴⁶

As regards the last type of conduct mentioned in UNCLOS article 101(a)(i)¹⁴⁷ – that is, “any act of depredation” – it is very difficult to see how one or several remote-controlled boats without on-board crew could commit plunder, pillage, or robbery. However, it is conceivable that such a ship could assist a traditional offender ship in overpowering a victim ship for the purpose of stealing valuables, cargo, or other types of property.¹⁴⁸ This scenario begs the question of whether the remote-controlled ship and the ship with an on-board crew *together* engage in an act of depredation (and thus piracy) in the sense of UNCLOS article 101(a)(i). The use of the singular word “ship” to denote the offender craft arguably does not allow for such a reading, and each ship must be assessed based on its own conduct. Yet, since depredation more often than not involves violence,¹⁴⁹ it can be argued that the remote-controlled ship commits an act of violence, while the offender ship carrying a crew commits an act of depredation. Alternatively, the remote crew can be said to be “intentionally facilitating” an act of piracy of the traditional offender ship – which amounts to piracy as defined in UNCLOS article 101(c). Indeed, a number of commentators have argued that, unlike UNCLOS article 101(a)(i), the “voluntary participation” offence in sub-paragraph (c) can be committed not only on the high seas or in the EEZ, but also from elsewhere, including dry land.¹⁵⁰

To conclude, this interpretative journey has demonstrated that the use of remote-controlled boats without on-board crew for the purpose of victimizing other ships may amount to piracy as defined in UNCLOS article 101(a)(i). Not only are these crafts clearly capable of engaging in (at least) an act of violence, but they also rather easily qualify as “ships” in the sense of the piracy provisions. The most intricate interpretational question is whether the term “crew” encompasses remote crews. Yet, even when pursuing a relatively restrictive approach to interpretation, which is necessary in light of the criminal law trait of the provision at stake, an affirmative answer seems tenable – at least if we agree that the sole function of UNCLOS article 101(a)(i) is to set out the scope of application of the enforcement measures provided for in UNCLOS articles 110 and 105.¹⁵¹ If we understand the provision on piracy to also amount to an international crime, based on which domestic criminal prosecutions can take place, the answer to whether a remote crew is a “crew” in the sense of UNCLOS article 101(a)(i) hinges on how demanding the domestic principle of legality is. These findings hold true with regard to a specific type of autonomous ships, namely remote-controlled crafts without on-board crew used to victimize other ships. Whether they apply equally to crafts featuring

different characteristics as regards the three elements of ship automation – technical capability, autonomy, and manning¹⁵² – requires a separate analysis.

4. The commission of SUA offenses through autonomous offender crafts

4.1. IMO Regulatory Scoping Exercise: not focused on maritime security

Next, we analyze whether an attack on a ship with a remote-controlled craft not carrying an on-board crew amounts to one or several offences as defined in the 1988 and 2005 SUA Conventions respectively. The discussion around whether these treaties stand the test of time and are capable of accommodating the turn to autonomous ships is not of a purely academic character, as it has already reached the IMO. The four SUA treaties belong to the set of instruments that are currently being scrutinized by the organization within the framework of its RSE.¹⁵³

As alluded to earlier, the exercise's methodology has primarily been developed for treaties belonging to the core topics dealt with by the organization,¹⁵⁴ which are maritime safety, prevention of marine pollution, and liability and compensation issues.¹⁵⁵ That the use of autonomous ships to commit maritime crimes is *not* the focus of the RSE accrues quite plainly from the description of its aim, which is to “determine how safe, secure and environmentally sound Maritime Autonomous Surface Ships (MASS) operations [...] might be addressed in IMO instruments”¹⁵⁶ – as it is certainly not the goal to allow autonomous *offender* vessels to operate in a safe and secure manner, but rather to outlaw their use. Further, the methodology developed for the provision-by-provision review of the treaties – the first step of the RSE¹⁵⁷ – offers four options for the assessment of each provision,¹⁵⁸ which essentially aim at clarifying whether current treaty rules “prevent” or “do not prevent” the use of (civilian) autonomous ships. These options work well for the analysis of rules that regulate international shipping, but less so for the SUA Conventions. Even though they were adopted under the auspices of the IMO, the SUA Conventions belong to a group of so-called “suppression conventions,”¹⁵⁹ which aim at suppressing harmful conduct by non-state actors and generally feature a similar structure. They oblige states parties to criminalize certain behavior under their domestic criminal law and to buttress the respective offences with appropriate sanctions. Further, they provide for the establishment of extra-territorial jurisdiction and for a variety of procedures paving the way for international cooperation in the suppression of these offences.¹⁶⁰ The ship-boarding provision of the 2005 SUA Convention belongs to the latter type of norms, as it sets out a procedure that allows states to board a suspect ship and thus a means to apprehend alleged offenders.¹⁶¹ As we will see later in more

detail, the references to “ship” in the SUA Conventions denote – depending on the provision – the victim vessel, the offender ship, the enforcement craft, or even a third ship not directly involved in a maritime security incident.¹⁶² From this accrues that the methodology of the RSE – where the assessment is carried out along the lines of whether the operation of (a civilian) MASS is “prevented” by the IMO treaty rules – is not entirely appropriate for a treaty defining offences and paving the way for inter-state cooperation to suppress transnational crime.

In practice, a pragmatic approach has been taken and the four options read in such a way as to permit an enquiry into the SUA Conventions’ continued relevance and applicability in situations where one or several crafts involved in a maritime security incident are autonomous. The “broad-brush review”¹⁶³ did not allow for consideration of all potential constellations – as mentioned, the victim, offender, and/or enforcer crafts may be autonomous – and of each aspect of the sometimes complex and long provisions of the SUA Conventions.¹⁶⁴ Yet, the exercise has the potential to further discussion of the maritime security-related aspects of increased automation in shipping – a discussion that has not yet progressed very far.¹⁶⁵ What is more, the RSE unearthed a series of potential gaps and themes with regard to both the 1988 and the 2005 SUA Conventions,¹⁶⁶ some of which are discussed next.

4.2. Definition of “ship”: the various categories of ships

A first issue considered during the RSE is whether autonomous crafts are “ships.” Unlike UNCLOS, which does not define the notion of “ship,”¹⁶⁷ both the 1988 and 2005 SUA Conventions contain an (identical) definition of the term.¹⁶⁸ As per article 1 of the 1988 SUA Convention, ship “means a vessel of any type whatsoever not permanently attached to the sea-bed, including dynamically supported craft, submersibles, or any other floating craft.” The drafters opted for a broad definition of “ship,” one that – together with the definition of “fixed platform” in the 1988 Fixed Platforms Protocol¹⁶⁹ – covers as many targets at sea as possible.¹⁷⁰ The definition remains the same under the 2005 SUA Convention, where it is included in a lengthy “terms and definitions” provision.¹⁷¹

In the 1988 SUA Convention, the term “ship” is predominantly used to refer to the category of “victim ship.”¹⁷² For example, in article 3, which defines the offences under the 1988 SUA Convention, the term “ship” appears repeatedly and each time denotes the vessel against which the respective unlawful act is committed.¹⁷³ In the 2005 SUA Convention, by contrast, the term ship is used in a more varied manner – for two main reasons. First, with the 2005 SUA Convention, two new types of offences were included in the treaty: offences where a ship is used as a weapon, weapons platform, or delivery system;¹⁷⁴ and offences where a ship serves as a means to transport illicit cargo¹⁷⁵ or alleged terrorists trying to evade

prosecution.¹⁷⁶ In these new offence definitions, the term “ship” is used to refer to the category of “offender ship.” Second, the 2005 Protocol added an enforcement layer to the convention by introducing a ship-boarding provision.¹⁷⁷ With this, the term “ship” may also denote a vessel authorized to take enforcement action at sea to suppress the offences defined in the 2005 SUA Convention, that is, an “enforcer ship.”¹⁷⁸ In sum, the term “ship,” which is defined in a uniform fashion for both SUA Conventions, is used to refer broadly to four types of ships – victim, offender, and enforcer crafts, and, at times, even to third ships not directly involved in maritime security incidents. The determination of which category of ships the term denotes in a specific provision only accrues from its interpretation.

As mentioned, the focus of the present chapter is on the category of “offender ships,” specifically on remote-controlled crafts without any on-board crew which are used to victimize other ships. In terms of the four degrees of autonomy, which the methodology of the RSE distinguishes, the crafts used thus far to carry out naval attacks correspond to the third degree: “[r]emotely controlled ships without seafarers on board,” that is, ships “controlled and operated from another location” that have “no seafarers on board.”¹⁷⁹ These crafts seem to fall within the definition of “ship” of the SUA Conventions,¹⁸⁰ the wording of which – “vessel of any type whatsoever” and “any other floating craft” – indicates that the term “ship” should cover the broadest range of crafts. The definition only mentions one exclusion criterion explicitly, namely that the feature must not be “permanently attached to the sea-bed.” As regards the 1988 SUA Convention, where the word “ship” is predominantly used to refer to the category of victim ships, this broad wording translates the drafters’ intent very well – that is, that the definitions of “ship” and “fixed platform” should be complementary and not leave any gaps in terms of potential targets at sea.¹⁸¹ Since the term “ship” was not changed under the 2005 SUA Convention, where it now also denotes offender crafts, the rationale of not leaving any gaps has been carried over to the means by which a SUA offence is committed. A contextual reading of the definition of “ship” also suggests the inclusion of remote-controlled ships used to commit offences at sea. As we will see in what follows,¹⁸² some of the SUA offence definitions explicitly refer to the commission of the respective crime by or through a ship;¹⁸³ by contrast, other offence definitions do not even specify the means by which safety of navigation is endangered.¹⁸⁴ With regard to the latter, the definition of “ship” – in the sense of the category of “offender ship” – does not even come into play. Hence, if we define “ship” in such a way as to exclude remote-controlled crafts, we would create a critically inconsistent result, whereby some SUA offences could be committed by remote-controlled boats, while others could not. What is more, reading the notion of “ship” as covering remote-controlled crafts aligns well with the SUA Conventions’ object and purpose, which can be defined as aiming at a comprehensive suppression of acts compromising maritime security, while

respecting the rule of law.¹⁸⁵ To exclude crafts that differ from traditional crafts in terms of technical capability and manning would run counter to this object and purpose.

The interim results of the IMO's RSE are consistent with the above finding that remote-controlled ships without on-board crew are "ships" in the sense of the SUA Conventions.¹⁸⁶ Interestingly, it has been highlighted that the SUA Conventions' definition of "ship" is even broader than the term "MASS" – which stands for Maritime Autonomous *Surface* Ships – since the definition extends to "submersibles."¹⁸⁷ The chances that offenders will increasingly rely on autonomous underwater crafts – for example, for smuggling purposes – are very real.¹⁸⁸ This, again, is indicative of the fact that the focus of RSE is on civilian shipping rather than on crimes at sea, where offenders are likely to rely on a broad range of crafts, including submersibles.

4.3. *SUA offences: commission by remote-controlled crafts*

The principal offences¹⁸⁹ defined in the 2005 SUA Convention¹⁹⁰ can, broadly speaking, be divided into three categories. The first category consists of offences outlawing harmful acts against ships, cargo, and persons on board. These crimes, which do not specify the means by which interference, damage or destruction is caused, are here referred to as "harm against ships" offences. The second category encompasses offences that prohibit the use of a ship as a means of committing a terrorist act; they are encapsulated by the notion of "ship as a weapon" offences. Finally, the 2005 SUA Convention contains a series of offences that ban the use of ships as a means of transporting specific items, such as explosive materials and certain types of weapons, or fugitive terrorists; they can be labeled "transportation" offences. The scenario analyzed here – where criminals use remote-controlled, explosive-laden boats without on-board crew to attack other ships – potentially fulfills offences of all three categories.

We start with the "harm against ships" offences, which are defined in article 3 of the 2005 SUA Convention.¹⁹¹ From the chapeau of the provision accrues that these offences are intentional crimes, but not terrorist offences proper, since no terrorist motivation on the part of the perpetrator is required.¹⁹² According to the list of prohibited acts, a person must not perform an act of violence against a person on board a ship, destroy a ship, or cause damage to a ship or to its cargo, place or cause to be placed on a ship, by any means whatsoever, a device or substance which is likely to destroy that ship, or cause damage to that ship or its cargo, or destroy or seriously damage maritime navigational facilities.¹⁹³ Strikingly, the provision does not mention, let alone limit, the *means* by which the interference, damage, or destruction is brought about; quite to the contrary, subparagraph (1)(d) even emphasizes that the device or substance that is likely to destroy a ship or cause damage to the ship can be placed on that ship "by

any means whatsoever.” It is no coincidence that article 3 remains silent on the potential means by which the respective violent, damaging, or disruptive act is committed. The offences in question were, in a more or less similar fashion, already contained in the 1988 SUA Convention,¹⁹⁴ the adoption of which was triggered by the *Achille Lauro* incident where terrorists posing as passengers engaged in harmful conduct on board the *victim* ship.¹⁹⁵ Absent the involvement of an offender ship and a victim ship, the incident did not qualify as piracy.¹⁹⁶ It is against this background that the drafters of the 1988 SUA Convention opted for relatively comprehensive offence definitions, which do not require an offender ship to be involved in the incident and which remain entirely silent on the means of commission. Consequently, “harm against ships” offences can be committed by means whatsoever – either without an offender ship, or with a traditional craft or a remote-controlled ship.

The remaining question is whether the reference to “person” in the chapeau element of article 3 of the 2005 SUA Convention includes remote-operators – above all, those acting from dry land.¹⁹⁷ Not only does the provision’s wording not exclude this scenario, a contextual reading of the norm even suggests the inclusion of those acting from shore among the potential offenders. First of all, article 4(1) of the 2005 SUA Convention, which defines the treaty’s geographical scope of application, has no limitative effect on the offender’s location, since its reference to “ship” pertains solely to the category of “victim ships.”¹⁹⁸ What is more, to trigger the application of the convention, it suffices that the victim ship is “scheduled to navigate” in waters described in article 4(1); hence, the 2005 SUA Convention potentially applies to a ship lying in port. Further, article 4(2) provides that even if the victim ship is *not* navigating or is *not* scheduled to navigate in waters defined in article 4(1), the convention nevertheless applies, provided that the (alleged) offender is found in the territory of another state party.¹⁹⁹ The fact that article 4(2) does not require the offender to have committed the offence at sea and *later* be found on the territory of another state, provides a further argument for including offenders acting from on shore. Finally, it also accrues from article 5*bis* of the 2005 SUA Convention that the offences defined in the treaty can be committed from dry land. The provision provides for the liability of corporations; and corporations generally act – through their organs – from dry land. Overall, it seems peculiar to argue that persons monitoring and controlling a ship from shore cannot commit the offences defined in article 3 of the 2005 SUA Convention.²⁰⁰

With this, we turn to the category of “ship as a weapon” offences, which are found in article 3*bis*(1)(a) of the 2005 SUA Convention.²⁰¹ Unlike the “harm against ship” offences, their commission presupposes a terrorist motivation on the part of the offender²⁰² but need not endanger the safe navigation of the victim ship.²⁰³ As regards the criminal conduct, the provision notably prohibits the discharge from a ship of any explosive

material in a manner that causes or is likely to cause death or serious injury or damage or to use a ship in a manner that causes death or serious injury or damage.²⁰⁴ The references to “ship” in these offence definitions pertain to the category of “offender ships,” which may be traditional or remote-controlled crafts.²⁰⁵ Provided the offender acts with terrorist intent, the scenario under scrutiny here – the use of explosive-laden, remote-controlled ships to attack other ships – seems to fulfill the mentioned offences. If terrorist motivation is lacking, we may fall back on “harm against ship” offences. Finally, the scenario may also amount to an offence falling within the category of “transportation” offences. As per article 3*bis*(1)(b)(i) of the 2005 SUA Convention, it is an offence to transport on board a ship any explosive material provided the offender acts with terrorist intent.²⁰⁶

To conclude, naval attacks carried out with remote-controlled boats rigged with explosives may fulfill several of the offences defined in the 1988 and 2005 SUA Conventions – even without unduly stretching the provisions’ wording.²⁰⁷ Yet, the scenario analyzed here does not cover the entire range of (existing and future) autonomous offender ships; and the conclusion will not necessarily be the same for crafts featuring different characteristics as regards technical capability, autonomy, and manning.

5. Conclusion

Non-state actors have already started relying on autonomous ships to commit maritime crimes – most notably to victimize other ships and infrastructure at sea. Even though present-day technology used to carry out naval attacks seems bulky and prototype-like – boats retrofitted with remote-control technology and rigged with explosives – its potential to cause harm and to compromise freedom of navigation and commercial shipping interests should not be underestimated.²⁰⁸ Whether the international legal framework ensuring maritime security is capable of accommodating the turn to autonomous offender ships, however, has yet to be analyzed in sufficient detail and depth. This chapter sets out to address this gap by examining whether the use of remote-controlled boats without on-board crew as a means of harming other ships and persons on board amounts to piracy as defined in article 101 of UNCLOS, or to one of the offences defined in the 1988 and 2005 SUA Conventions respectively.

As regards the definition of piracy, the highest interpretational hurdle is arguably the requirement that the piratical act be “committed [...] by the crew” of a ship. Yet, even when leaning towards a more restrictive approach to interpretation, it seems tenable to argue that a remote crew can engage in piracy – at least if we understand the function of UNCLOS article 101 to be the delimitation of the scope of the enforcement powers provided for in UNCLOS articles 110 and 105, rather than to serve as a basis for domestic criminal prosecutions. Overall, the answer to whether piracy can

be committed by a remote-controlled offender craft depends on the interpretative approach taken.

By contrast, the wording of the various offences of the 1988 and 2005 SUA Conventions seems to accommodate the turn to autonomous offender ships rather effortlessly.²⁰⁹ We have seen that regardless of whether the perpetrators act with terrorist intent, the use of remote-controlled crafts to explode other ships may fulfill various offences of the SUA Conventions. However, it is important to keep in mind that despite being labeled “offences” in the SUA Conventions, they are not “offences” at all.²¹⁰ Rather, the SUA Conventions oblige states parties to enact respective criminal offences under their domestic law and to equip them with appropriate penalties.²¹¹ Put differently, an offender cannot be prosecuted based on the SUA Conventions as such, since the right to criminalize (*ius puniendi*) remains with state parties.²¹² The specific reach and coverage of the SUA offences thus ultimately depends on *domestic* criminal law and may vary considerably between jurisdictions²¹³ – as may the understanding of whether autonomous ships are covered by the respective domestic criminal provisions. The SUA Conventions, which are “suppression conventions,” are rooted in the idea of harmonization and standardization of substantive criminal law, which paves the way for inter-state cooperation in criminal matters.²¹⁴ As regards the question of whether autonomous offender ships are covered by the SUA offences, a *common* understanding among states is, however, still lacking.²¹⁵ Yet by virtue of the RSE, which is conducted within the IMO, we are in the unique position that we already have forum for exchange, and perhaps even consensus, on “a base line of criminalisation”²¹⁶ as regards autonomous offender ships. Since the wording of the SUA offences is flexible enough to accommodate autonomous offender ships, reaching such a common understanding will not necessitate a formal amendment of the treaty – which is fortunate given that at this juncture there seems to be little appetite among states to open up the SUA Conventions.

Notes

- 1 The term “autonomous ship” is used in a generic way in this chapter (similar to its use in the title of this book). For a refined discussion on ship automation and the types of technology criminals rely on when committing harmful acts at sea, see below, section 2.1 and specifically the text relating to notes 33–37 and 52 on the notion of “autonomy” and the offender ships’ degree of autonomy as defined here.
- 2 See, e.g., Automatic Ferry First Claimed by Kongsberg available at <https://shipinsight.com/articles/automatic-ferry-first-claimed-by-kongsberg>, and Trials Start on Mayflower’s AI System in Readiness for Historic Transatlantic Crossing available at <https://shipinsight.com/articles/trials-start-on-mayflowers-ai-system-in-readiness-for-historic-transatlantic-crossing>.
- 3 A. Chircop “Testing international legal regimes: the advent of automated commercial vessels” (2017) 60 *German Yearbook of International Law*, 1–31,

- at 4; see also H. Ringbom “Legalizing autonomous ships” (2020) 34 *Ocean Yearbook*, 459–460, stating that MASS as part of the technological development and digitalization of society “is not going to go away.”
- 4 See IMO Doc. MSC 99/WP.9 of 23 May 2018, Annex 1, 1, para. 6, referring to “Appendix 1: List of instruments related to maritime safety and security,” which identifies 14 instruments to be considered; and IMO Doc. LEG 106/WP.5 of 29 March 2019, Annex 1, 1, para. 6, referring to “Appendix 1: List of instruments emanating from the Legal Committee,” comprising, *inter alia*, 19 treaties under the purview of the Legal Committee (LEG) that come within the RSE.
 - 5 As compared to the past, when IMO instruments were generally developed in a reactive manner, often in response to maritime casualties and incidents, see A. Chircop “The International Maritime Organization” in D. Rothwell et al. (eds) *The Oxford Handbook of the Law of the Sea* (OUP, Oxford, 2015) 436.
 - 6 When including the RSE in its biennial agenda 2018–2019, the Maritime Safety Committee (MSC) set 2020 as a target completion date: IMO Doc. MSC 98/23 of 28 June 2017, 79, para. 20.2; the LEG, which included the new output in its biennial agenda in 2018, indicates 2022 as a target completion date: IMO Doc. LEG 105/14 of 8 February 2018, 20, para. 11.11.
 - 7 IMO Doc. MSC.1/Circ. 1604 of 14 June 2019, Annex; for the aim, see Annex, para. 1.1.
 - 8 For an overview on Houthi naval attacks, notably through the use of remote-controlled boats, see Analysis: Houthi Naval Attacks in the Red Sea available at www.longwarjournal.org/archives/2019/08/analysis-houthi-naval-attacks-in-the-red-sea.php.
 - 9 See, in general, M. Brundage et al. *The Malicious Use of Artificial Intelligence: Forecasting, Prevention, and Mitigation* (Future of Humanity Institute, University of Oxford, 2018); and below, section 2.1.
 - 10 If Drones Ruled the Waves: Avast, Me Hearties available at www.economist.com/world-if/2018/07/07/avast-me-hearties on how “aquatic, autonomous robots could reduce lawlessness at sea;” on how Japan, South Korea, and Singapore rely on autonomous technology for law enforcement purposes, see Indo-Pacific Countries Turn to Unmanned Vessels to Patrol Region’s Waters available at <http://apdf-magazine.com/indo-pacific-countries-turn-to-unmanned-vessels-to-patrol-regions-waters/>.
 - 11 In the Pitcairn Island Marine Protected Area (MPA), the *Wave Glider* – an unmanned maritime system powered by wave and solar energy – has been deployed to counter illegal fishing: How Unmanned Surface Vehicles Can Shine Light on Dark Targets & Cue Assets for Inspection and Interdiction available at <https://cdn2.hubspot.net/hubfs/287872/website-downloads/LR-Shine-Light-On-Dark-Targets.pdf> 3–6.
 - 12 Metal Shark and Sea Machines Launch New Sharktech Autonomous Vessel available at www.metalsarkboats.com/september-24th-2019-metal-shark-and-sea-machines-launch-new-sharktech-autonomous-vessel/; China Launches JARI Combat Drone Boat available at <https://thedefensepost.com/2019/08/23/china-jari-combat-drone-boat-launched/>.
 - 13 See, e.g., the Interim Guidelines for MASS Trials, note 7, stating at para. 2.10 that “[a]ppropriate steps should be taken to ensure sufficient cyber risk management;” and the Comité Maritime International (CMI) writes that “hacking may need special consideration in the context of MASS:” IMO Doc. LEG 107/8 of 13 December 2019, 3, para. 15. Chircop, note 3 at 5, optimistically states that the “design and the absence of a crew will make it difficult for pirates to board” an autonomous ship, but expresses concerns in relation to their cyber

- security. Spotlight: Autonomous Vehicles: Is Your Cargo Safe On Board an Autonomous Vessel? available at www.postonline.co.uk/technology/4485961/spotlight-autonomous-vehicles-is-your-cargo-safe-on-board-an-autonomous-vessel, also states that the design of autonomous ships will make it impossible or more difficult for pirates to board them and, absent an on-board crew, hostage-taking is not a *modus operandi* either, but describes a series of potential new piracy tactics.
- 14 See, e.g., 1982 United Nations Convention on the Law of the Sea (UNCLOS) Art. 107 defining the ships entitled to seize on account of piracy.
 - 15 Pentagon Unmanned Systems Integrated Roadmap 2017–2042 available at <https://news.usni.org/2018/08/30/pentagon-unmanned-systems-integrated-roadmap-2017-2042> and 20; see N. Klein “Maritime autonomous vehicles within the international legal framework to enhance maritime security” (2019) 95 *International Legal Studies*, 244–271, at 247–248. The same argument is made in the context of the civilian shipping world: see Ringbom, note 3 at 459–460, who further argues that “[t]he main risk posed by a widening gap between the expectations of progressive States and the legal reality is that the former start implementing their own solutions as flag States and that MASS eventually becomes subject to different legal definitions and requirements in different parts of the world.”
 - 16 Apart from the contributions in this book, see, e.g., Ringbom, note 3; H. Ringbom “Regulating autonomous ships: concepts, challenges, precedents” (2019) 50 *Ocean Development & International Law*, 141–169; T. Karlis “Maritime law issues related to the operation of unmanned autonomous cargo ships” (2018) 17 *WMU Journal of Maritime Affairs*, 119–128; Chircop, note 3; L. Carey “All hands off deck? The legal barriers to autonomous ships” (2017) 23 (3) *Journal of International Maritime Law*, 202–219; R. Veal and M. Tsimplis “The integration of unmanned ships into the *Lex Maritima*” (2017) *Lloyd’s Maritime and Commercial Law Quarterly*, 303–335.
 - 17 Instead of many, see M.N. Schmitt and D.S. Goddard “International law and the military use of UMS” (2016) 98 (2) *International Review of the Red Cross*, 567–592; R. McLaughlin “Unmanned naval vehicles and the law of naval warfare” in H. Nasu and M. McLaughlin (eds) *New Technologies and the Law of Armed Conflict* (Springer, The Hague, 2014) 229–246; and M. de Zwart “New technologies and the law of naval warfare” in D. Stephens and M. Stubbs (eds) *The Law of Naval Warfare* (Lexis Nexis Butterworths, Chatswood, 2020) 305–320.
 - 18 Observing this and also providing one of the first analyses: Klein, note 15 at 245; see also A. Petrig “La ‘révolution robotique’ en mer et la Convention de Montego Bay: Un défi interprétatif pour ses dispositions relatives à la criminalité maritime?” (2019) 23 *Annuaire du droit de la mer*, 17–43; A. Petrig “The commission of maritime crimes with unmanned systems: an interpretive challenge for UNCLOS” in M. Evans and S. Galani (eds) *Maritime Security and the Law of the Sea: Help or Hindrance?* (Edward Elgar Publishing, Cheltenham, 2020) 104–131; K. Chadwick “Unmanned maritime systems will shape the future of naval operations: is international law ready?” in Evans and Galani (eds) *Maritime Security and the Law of the Sea: Help or Hindrance?* (Edward Elgar Publishing, Cheltenham, 2020) 151–155. For a brief discussion on whether ships without on-board crew are ships in the sense of Art. 1 of the 2005 SUA Convention, see J. Kraska “Effective implementation of the 2005 Convention for the Suppression of Unlawful Acts Against the Safety of Maritime Navigation” (2017) 70 (1) *Naval War College Review*, 13–14.
 - 19 Convention for the Suppression of Unlawful Acts Against the Safety of Maritime Navigation of 10 March 1988, 1678 UNTS 221 (1988 SUA

- Convention), amended by the 2005 Protocol to the 1988 Convention for the Suppression of Unlawful Acts Against the Safety of Maritime Navigation of 14 October 2005, IMO Doc. LEG/CONF.15/21 (2005 SUA Convention); Protocol to the Convention of 10 March 1988 for the Suppression of Unlawful Acts Against the Safety of Fixed Platforms Located on the Continental Shelf of 10 March 1998, 1678 UNTS 201 (1988 Fixed Platforms Protocol); Protocol of 2005 to the Protocol for the Suppression of Unlawful Acts Against the Safety of Fixed Platforms Located on the Continental Shelf of 14 October 2005, IMO Doc. LEG/CONF.15/22 (2005 Fixed Platforms Protocol).
- 20 See below, text relating to notes 154 to 162.
 - 21 On the three main categories of treaties, see Adopting a Convention, Entry into Force, Accession, Amendment, Enforcement, Tacit Acceptance Procedure available at www.imo.org/en/About/Conventions/Pages/Home.aspx.
 - 22 Reaching this conclusion for (IMO) regulations on international shipping: Chircop, note 3 at 29 and 31.
 - 23 Arguing that the advent of autonomous systems at sea has no disruptive effect on international law (of the sea) because its general principles continue to apply: Klein, note 15 at 271; R. McLaughlin “Unmanned naval vehicles at sea: USVs, UUVs and the adequacy of the law” (2011) 21 *Journal of Law, Information and Science*, 100–115, at 103–108; J. Kraska “The law of unmanned naval systems in war and peace” (2010) 5 (3) *The Journal of Ocean Technology*, 64.
 - 24 1982 United Nations Convention on the Law of the Sea (UNCLOS).
 - 25 The present chapter focuses only on the 1988 and 2005 SUA Conventions and does not take into account the 1988 and 2005 Fixed Platforms Protocols; further, it analyses naval attacks carried out by autonomous ships solely under the law governing law enforcement operations and does not address questions that could emerge under the law of armed conflict at sea, including that of its applicability.
 - 26 Same finding and discussing terminology: Chircop, note 3 at 7; Klein, note 15 at 248–251.
 - 27 On terminology, see Ringbom and Collin, chapter 2 of this book.
 - 28 *Ibid.* section 2.
 - 29 *Ibid.*, section 2.1.
 - 30 *Ibid.*, section 2.1.1.
 - 31 *Ibid.*, section 2.1.2, referring to the definition offered by M. Tegmark *Life 3.0 – Being Human in the Age of Artificial Intelligence* (Alfred A. Knopf, New York, 2017) 50. See also the definition of Brundage et al., note 11 at 9: “AI [artificial intelligence] refers to the use of digital technology to create systems that are capable of performing tasks commonly thought to require intelligence.”
 - 32 See Ringbom and Collin, note 27, section 2.1.2.
 - 33 *Ibid.*, section 2.3.
 - 34 *Ibid.*, section 2.3 (emphasis omitted).
 - 35 *Ibid.*, section 2.3.
 - 36 *Ibid.*, section 2.3.
 - 37 *Ibid.*, section 2.3.
 - 38 New Houthi Weapon Emerges: A Drone Boat available at www.defensenews.com/digital-show-dailies/index/2017/02/19/new-houthi-weapon-emerges-a-drone-boat/; Navy: Saudi Frigate Attacked by Unmanned Bomb Boat, Likely Iranian available at <https://news.usni.org/2017/02/20/navy-saudi-frigate-attacked-unmanned-bomb-boat-likely-iranian>.
 - 39 See, e.g., Saudi Navy Intercepts Two Explosives-Filled Drone Boats available at www.maritime-executive.com/article/saudi-navy-intercepts-two-explosives-

- filled-drone-boats; Drone Boats Filled with Explosives Are the New Weapon in Global Terrorism available at www.businessinsider.com/drone-boats-filled-with-explosives-houthi-saudi-arabia-2018-10?r=US&IR=T.
- 40 See, e.g., Arab Alliance Foils Al Houthi Red Sea Attack available at <https://gulfnews.com/world/gulf/yemen/arab-alliance-foils-al-houthi-red-sea-attack-1.69897430>.
- 41 See, e.g., Saudi Coalition “Foils Attack” on Oil Tanker Off Yemen’s Coast available at www.aljazeera.com/news/2020/03/saudi-coalition-foils-attack-oil-tanker-yemen-coast-200304141609432.html.
- 42 In the commercial shipping world, the decision about a ship’s technical capabilities is usually made when it is built, but upgrading them later is also a possibility: see Ringbom and Collin, note 27, section 2.1; Chircop, note 3 at 2.
- 43 See Conflict Armament Research Anatomy of a “Drone Boat” available at <https://www.conflictarm.com/perspectives/anatomy-of-a-drone-boat/>, for an example of modifications needed to use an ordinary boat as an offender ship.
- 44 Analysis: Houthi Naval Attacks in the Red Sea available at www.longwarjournal.org/archives/2019/08/analysis-houthi-naval-attacks-in-the-red-sea.php.
- 45 Conflict Armament Research Anatomy of a “Drone Boat”, note 43 at 2; Saudi-Led Coalition Displays Yemeni Arms Allegedly from Iran available at www.timesofisrael.com/saudi-led-coalition-displays-yemeni-arms-allegedly-from-iran/.
- 46 The Islamic State and Drones: Supply, Scale, and Future Threats available at <https://ctc.usma.edu/islamic-state-drones-supply-scale-future-threats/>. On the increasing ability of Houthi rebels to inflict damage through the use of UAVs, see Conflict Armament Research Evolution of UAVs Employed by Houthi Forces in Yemen available at www.conflictarm.com/dispatches/evolution-of-uavs-employed-by-houthi-forces-in-yemen/.
- 47 C.H. Allen “The seabots are coming here: should they be treated as ‘vessels?’” (2012) 65 *The Journal of Navigation*, 750; Klein, note 15 at 260, arguing that semi-submersible vessels with on-board crew are already being used for smuggling purposes and, therefore, “it would seem a natural progression to deploy underwater MAV [Maritime Autonomous Vehicles] for similar purposes.”
- 48 See, e.g., The Use of Modified Surfboards by Mexican Drug Cartels: Narco-Subs, Cartels and Law Enforcement available at www.foreignbrief.com/security-terrorism/narco-subs.
- 49 See Brundage et al., note 9 at 19, noting that not only progress in intelligence but also in robotics, combined with declining costs of hardware, contribute to “the expansion of existing threats” and referring to the use of cheap hobbyist aerial drones by the so-called Islamic State to launch attacks.
- 50 As per Brundage et al., note 9 at 59, the ability of attackers to rely on AI to cause harm will increase significantly in the near future.
- 51 See text relating to notes 33–37.
- 52 In relation to remote-controlled aerial drones deployed to cause harm, which seem comparable in terms of autonomy to remote-controlled ships used for similar purposes, Brundage et al., note 9 at 39, state that they evolved from “relatively unstable and hard-to-fly drones” to “drones that can stabilize themselves automatically.” In light of the scarce information about offender ships used for malicious purposes, it is unknown whether similar subordinate tasks are automated.
- 53 As regards the attack against the Saudi frigate Al Madinah (see text relating to note 38), it is stated that the offenders operated from Yemen’s coastal waters: Conflict Armament Research Anatomy of a “Drone Boat”, note 43.

- 54 As per Ringbom and Collin, note 27, section 2.1.1, the scope of remote operability, which may vary from vessel to vessel, ranges from monitoring a particular system to the full controllability of all the ships' key systems.
- 55 *Ibid.*, section 2.2.
- 56 *Ibid.*
- 57 Crewing is as such "one of the most significant elements in a ship's cost structure" (see Chircop, note 3 at 5; costs will often be even more significant if persons are hired to embark on an illicit journey; see, e.g., in relation to drug-trafficking by using traditional "narcosubs:" Life On Board a Narcosubmarine available at www.insightcrime.org/news/analysis/life-on-board-a-narcosubmarine/).
- 58 New Houthi Weapon Emerges: A Drone Boat available at www.defensenews.com/digital-show-dailies/index/2017/02/19/new-houthi-weapon-emerges-a-drone-boat/: with remote-controlled, explosive laden ships "you don't need suicide attackers to do a suicide-like attack."
- 59 20,000 Drones Under the Sea available at <https://www.usni.org/magazines/proceedings/2018/july/20000-drones-under-sea>.
- 60 In general, see W. Rudischhauser "Autonomous or semi-autonomous weapons systems: a potential new threat of terrorism?" (2017) 23 *Security Policy Working Papers*, 3, available at www.baks.bund.de/en/working-papers; Brundage et al., note 9 at 5, 21–22 and 62; in the context of violations of pollution prevention laws by autonomous ships, see Chircop, note 3 at 16–17.
- 61 Brundage et al., note 9 at 17 and 19.
- 62 *Ibid.*, at 2.
- 63 Remote Controlled Terror: Houthi Suicide Boats available at <https://eeradicalization.com/remote-controlled-terror-houthi-suicide-boats/>.
- 64 Brundage et al., note 9 at 27.
- 65 This holds especially true in crowded littoral environments, see Remote Controlled Terror: Houthi Suicide Boats available at <https://eeradicalization.com/remote-controlled-terror-houthi-suicide-boats/>.
- 66 Saudi-Coalition Intercepts Houthi Unmanned Explosives-Laden Boats available at www.marsecreview.com/2019/10/saudi-coalition-intercepts-houthi-unmanned-explosives-laden-boats/.
- 67 Remote Controlled Terror: Houthi Suicide Boats available at <https://eeradicalization.com/remote-controlled-terror-houthi-suicide-boats/>.
- 68 Brundage et al., note 9 at 28.
- 69 On human-machine teaming, see Brundage et al., note 9 at 27–28; for an attempted attack of a tanker by Houthi rebels with four offender ships, one of which was remote-controlled and intended to be used to explode the target, see Saudi Coalition "Foil Attack" on Oil Tanker Off Yemen's Coast available at www.aljazeera.com/news/2020/03/saudi-coalition-foils-attack-oil-tanker-yemen-coast-200304141609432.html.
- 70 Brundage et al., note 9 at 38.
- 71 This is not unique to the commission of maritime crimes with autonomous technology; it also applies to, e.g., the commission of piracy with traditional ships; see A. Murdoch "Recent legal issues and problems relating to acts of piracy off somalia" in C.R. Symmons (ed) *Selected Contemporary Issues in the Law of the Sea* (Martinus Nijhoff Publishers, Leiden, 2011) 139, stating: "What has been remarkable about Somali pirates is their proven ability to routinely use such *rudimentary tactics* to seize huge vessels, and to keep their crews hostage for protracted periods until payment of a ransom." (emphasis added).
- 72 Brundage et al., note 9 at 38.
- 73 See above, notes 1 and 33–37.

- 74 Tesla's Toy Boat: A Drone Before Its Time available at www.engadget.com/2014/01/19/nikola-teslas-remote-control-boat/.
- 75 Carey, note 16 at 1–2.
- 76 On this premise, see Ringbom, note 3 at 431; Chircop, note 3 at 6 and 18.
- 77 UNCLOS, Art. 101(a); in detail, see below, section 3.3.
- 78 UNCLOS, Art. 105, first sentence.
- 79 UNCLOS, Art. 105, second sentence.
- 80 Ringbom, note 16 at 163–164, similarly concludes – with regard to “a hypothetical large commercial ship engaged in international trade carrying nondangerous cargo” – that “many of the key legal issues will arise at a very early stage of development.”
- 81 Absent contemporary relevance, UNCLOS Art. 101(a)(ii) is not considered any further here.
- 82 See, e.g., Chircop, note 3 at 15, on the potential and limits of constructive interpretation of flag state duties under UNCLOS.
- 83 In the context of autonomous ships specifically, see E. Silva Pereira *Unmanned Vessels & Unmanned Maritime Vehicles: Prospects of a Legal Framework in the International and Portuguese Context* (Ciimar, Matosinhos, 2019) 3 and 40–43; on this main interpretative strategy to keep UNCLOS abreast of change, see Petrig, note 18 at 114–118.
- 84 On the intradisciplinary nature of maritime security related provisions of UNCLOS, see Petrig, note 18 at 120–123.
- 85 1988 SUA Convention, Art. 3; 2005 SUA Convention, Arts. 3, *3bis*, *3ter*, and *3quater*.
- 86 N. Jain “Interpretive divergences” (2017) 57 *Virginia Journal of International Law*, 45–95, at 83.
- 87 Nulla Poena Nullum Crimen Sine Lege available at <http://opil.ouplaw.com/home/EPIL> paras. 1, 28 and 31.
- 88 For a refined argument, see Petrig, note 18 at 118–130.
- 89 Vienna Convention on the Law of Treaties of 23 May 1969, 1155 UNTS 331 (VCLT).
- 90 UN Doc. A/CN.4/SER.A/1966/Add.1 of 1966, 95, para. 4.
- 91 There are various readings of Art. 31(3)(c) of the VCLT; see O. Dörr “Article 31: General rules of interpretation” in O. Dörr and K. Schmalenbach (eds) *Vienna Convention on the Law of Treaties: A Commentary* 2nd (Springer, Berlin, 2018) 610 et seq. The requirement that the external rules be “applicable in the relations between the parties” is understood broadly in the present context, since UNCLOS Art. 93 – the treaty’s own systemic integration rule – does not contain this requirement: see A. Petrig and M. Bo “The International Tribunal for the Law of the Sea and Human Rights” in M. Scheinin (ed) *Human Rights Norms in “Other” International Courts* (CUP, Cambridge, 2019) 365.
- 92 I. Papanicolopulu *International Law and the Protection of People at Sea* (OUP, Oxford, 2018) 102.
- 93 L. Grover *Interpreting Crimes in the Rome Statute of the International Criminal Court* (CUP, Cambridge, 2014) 143.
- 94 See above, section 2.1.
- 95 UNCLOS, Preamble, para. 1.
- 96 J.E. Noyes “Interpreting the 1982 Law of the Sea Convention and Defining Its Terms” in G.K. Walker (ed) *Definitions for the Law of the Sea: Terms Not Defined by the 1982 Convention* (Martinus Nijhoff, Leiden, 2012) 55, 56, 61; H. Meyers *The Nationality of Ships* (Martinus Nijhoff, Leiden, 1967) 15–16 and 22–23; L. Lucchini “Le navire et les navires” in Société Française pour le

- Droit International (ed) *Le navire en droit international* (Pedone, Paris, 1992) 18–20. Contributions on automation in shipping, which contain *general* discussions on whether an autonomous ship can be a “ship” or “vessel” under international maritime law or the law of the sea are, hence, not particularly helpful; see, e.g., the analysis by O. Daum “The implications of International Law on Unmanned Naval Craft” (2018) 49 (1) *Journal of Maritime Law & Commerce*, 75–85, who concludes at 101 that “an unmanned naval craft is not a ship in terms of the international law of the sea.”
- 97 This also applies to traditional ships involved in a piracy incident. For example, the offender ship must be a “private ship,” while the victim ship is not further qualified and can therefore also be a state craft; see, e.g., T.R. Salomon *Die internationale Strafverfolgungsstrategie gegenüber somalischen Piraten* (Springer, Berlin, 2017) 155.
- 98 Harvard Draft Convention and Commentary, reprinted in ASIL, “Codification of International Law: Part IV – Piracy” (1932) 26 *American Journal of International Law Supplement* 768 (emphasis added).
- 99 *Ibid.*, at 767.
- 100 *Ibid.*, at 768.
- 101 UN Doc. A/CN.4/SER.A/1956/Add.1 of 1956, 282, Art. 39; the materials do not elucidate the Commission’s choice.
- 102 Convention on the High Seas of 29 April 1958, 450 UNTS 82, Art. 15.
- 103 In the sense of VLCT, Art. 31(4); as per R. Gardiner *Treaty Interpretation* 2nd (OUP, Oxford, 2015) 334, a notion has a special meaning if the drafters provided it with a meaning “that differs from the more common meaning,” that is, “from the expected one.”
- 104 *Kasikili/Sedudu Island (Botswana/Namibia)* ICJ Reports 1999, 1045, Declaration of Judge Higgins, 72, para. 2.
- 105 UN Doc. A/CN.4/SER.A/1955 of 2 May–8 July 1955, 55, para. 4. The ILC adopted the text prepared by the Dutch Rapporteur François, which essentially consisted in a French translation of the provisions of the Harvard Draft Convention on Piracy; see R. Geiss and A. Petrig *Piracy and Armed Robbery at Sea: The Legal Framework for Counter-Piracy Operations in Somalia and the Gulf of Aden* (OUP, Oxford, 2011) 39.
- 106 UN Doc. A/CN.4/SER.A/1955 of 2 May–8 July 1955, 55, para. 10.
- 107 Compare Art. 15 of the Convention on the High Seas of 29 April 1958 with Art. 39 of the ILC Draft (ILC “Article concerning the Law of the Sea with commentaries” UN Doc. A/CN.4/SER.A/1956/Add.1 of 1956, 282).
- 108 Dörr, note 91 at 573.
- 109 See above, text relating to notes 43 to 45.
- 110 Salomon, note 97 at 134.
- 111 *Constitution of the Maritime Safety Committee of the Inter-Governmental Maritime Consultative Organization* (Advisory Opinion) ICJ Reports 1960, 150, 158.
- 112 From a combined reading of UNCLOS Arts. 101(a) and 58 accrues that piracy can also be committed in the exclusive economic zone.
- 113 Geiss and Petrig, note 105 at 62–63; Salomon, note 97 at 134.
- 114 See above, text relating to note 56.
- 115 See above, text relating to notes 56 to 61.
- 116 M. Wood “Reflections on the United Nations Convention on the Law of the Sea: a living instrument” in J. Barrett and R. Barnes (eds.) *Law of the Sea: UNCLOS as a Living Treaty* (BIICL, London, 2016) lxxvii–lxxx, at lxxx and lxxx.

- 117 See above, text relating to notes 98 to 107; and Geiss and Petrig, note 105 at 37–41.
- 118 See above, text relating to note 106.
- 119 Passenger (English Oxford Living Dictionaries) available at <https://en.oxforddictionaries.com/>.
- 120 See above, section 3.1.
- 121 Papanicolopulu, note 92 at 102.
- 122 B.H. Oxman “Human Rights and the United Nations Convention on the Law of the Sea” (1998) 36 *Columbia Journal of International Law*, 402.
- 123 Ibid.
- 124 Ibid., at 404.
- 125 Whether the provision performs the latter function is contested, see below, text relating to notes 133 to 137 and Salomon, note 97 at 96–122.
- 126 Rule of Law available at <http://opil.ouplaw.com/home/EPIL> para. 2.
- 127 See UNCLOS, Art. 101(1).
- 128 On the difficulty of identifying remote-controlled crafts currently used by criminals as offender ships, see text relating to note 65.
- 129 On the higher evidentiary standards compared with the right of visit, see A. Petrig “Piracy” in D.R. Rothwell et al. (eds) *The Oxford Handbook of the Law of the Sea* (OUP, Oxford, 2015) 851–852.
- 130 On the quality of law standard under the right of liberty as enshrined in international human rights law, see A. Petrig *Human Rights and Law Enforcement at Sea Arrest, Detention and Transfer of Piracy Suspects* (Brill Nijhoff Publishers, Leiden, 2014) 213–228.
- 131 See the opening words of UNCLOS Art. 105: “On the high seas;” for the EEZ, see note 112.
- 132 The alternative would be to act from a platform.
- 133 D. Guilfoyle “Book review: Robin Geiss and Anna Petrig, Piracy and armed robbery at sea: the legal framework for counter-piracy operations in Somalia and the Gulf of Aden” (2011) 11 *International Criminal Law Review*, 912–913; R. Wolfrum “Hohe See und Tiefseeboden (Gebiet)” in W.G. Vitzthum (ed) *Handbuch des Seerechts* (CH Beck, Munich, 2006) 307.
- 134 Nulla Poena Nullum Crimen Sine Lege available at <http://opil.ouplaw.com/home/EPIL> para. 19.
- 135 Ibid., para. 1.
- 136 N. Boister *Transnational Criminal Law* 2nd (OUP, Oxford, 2018) 39.
- 137 A. Rubin *The Law of Piracy* 2nd (Transnational Publishers, New York, 1998) 391–393; R. Lagoni “Piraterie und widerrechtliche Handlungen gegen die Sicherheit der Schifffahrt” in J. Ipsen and E. Schmidt-Jortzig (eds) *Recht – Staat – Gemeinwohl: Festschrift für Dietrich Rauschnig* (Carl Heymanns, Köln, 2001) 523–524; the author of present chapter agrees with the aforementioned commentators: Petrig “Piracy,” note 129 at 859.
- 138 R. Churchill “The piracy provisions of the UN Convention on the Law of the Sea – fit for purpose?” in P. Koutrakos and A. Skordas (eds) *The Law and Practice of Piracy at Sea: European and International Perspectives* (Hart Publishing, Oxford, 2014) 13.
- 139 D. Guilfoyle “Article 101: Definition of Piracy” in A. Proelss (ed) *United Nations Convention on the Law of the Sea: A Commentary* (Beck/Hart Publishing, Oxford, 2017) 740.
- 140 For a brief overview of various forms of contemporary piracy, see Petrig, note 129 at 844; see ICC IMB Piracy and Armed Robbery Against Ships, Report for the Period between 1 January and 31 December 2019 available at www.icc-ccs.org/reports/2019_Annual_Piracy_Report.pdf 24–25, summarizing current trends.

- 141 See above, text relating to notes 42 to 45.
- 142 Guilfoyle, note 139 at 740.
- 143 Churchill, note 138 at 15; similarly, Salomon, note 97 at 132.
- 144 See above, text relating to notes 38 to 45.
- 145 Pentagon Unmanned Systems Integrated Roadmap 2017–2042, note 15 at 20 and 34, identifies swarming capabilities as a key technology in the realm of unmanned systems.
- 146 See Salomon, note 97 at 125, arguing that all acts enumerated in Art. 101 of UNCLOS can be committed alternatively against either the ship, persons on board, or property on board.
- 147 See *ibid.*, at 126, arguing that the list of acts contained in UNCLOS Art. 101 – acts of violence, detention, or depredation – is exhaustive.
- 148 See above, text relating to note 69 for an example of an attack in the Red Sea where offender vessels with remote crew and on-board crew teamed up in order to carry out an attack.
- 149 According to Salomon, note 97 at 127, historically, an act of violence was sometimes seen as a prerequisite for piracy.
- 150 Geiss and Petrig, note 105 at 64; Murdoch, note 71 at 158; Salomon, note 97 at 171–174, discusses the geographical scope of application of UNCLOS Art. 101(c) and concludes that state practice tends towards including dry-land piracy in this offence.
- 151 Geiss and Petrig, note 105 at 141.
- 152 See above, text relating to note 28.
- 153 See above, text relating to note 19.
- 154 The methodology was initially developed by the MSC and later slightly adjusted by the LEG for the treaties falling within its purview, notably by deleting the reference to “equivalences” as these are not provided for by any of the instruments under the review of the LEG: IMO Doc. LEG 106/WP.5 of 29 March 2019, paras 7–9.
- 155 See above, note 21.
- 156 IMO Doc. LEG 106/WP.5 of 29 March 2019, para. 1.
- 157 See IMO Doc. LEG 106/WP.5 of 29 March 2019, para. 8; as per para. 10, the second step consists in an analysis of the “most appropriate way of addressing MASS operations” whereby the following four options can be chosen: developing interpretations; and/or amending the existing instrument; and/or developing new instruments; or none of these.
- 158 As per IMO Doc. LEG 106/WP.5 of 29 March 2019, Annex, para. 8, the four options are: “.A apply to MASS and prevent MASS operations; or .B apply to MASS and do not prevent MASS operations and require no actions; or .C apply to MASS and do not prevent MASS operations but may need to be amended or clarified, and/or may contain gaps; or .D have no application to MASS operations.”
- 159 D. Guilfoyle “Piracy and suppression of unlawful acts against the safety of maritime navigation” in N. Boister and R.J. Currie *Routledge Handbook of Transnational Criminal Law* (Routledge, New York, 2015) 374.
- 160 N. Boister “‘Transnational Criminal Law’?” (2003) 14 *EJIL*, 955.
- 161 N. Klein *Maritime Security and the Law of the Sea* (OUP, Oxford, 2011) 173–174.
- 162 See below, text relating to notes 172 to 178.
- 163 Expression used by Ringbom, note 16 at 162.
- 164 The provision-by-provision assessment was even carried out at the level of paragraphs; still, as regards the offence definitions, one paragraph often comprises several offences (see, e.g., Arts. 3(1) and 3bis(1) of the 2005 SUA

- Convention); and the ship-boarding provision, Art. 8bis of the 2005 SUA Convention, also comprises very long paragraphs (see, e.g., Art. 8bis(10) of the 2005 SUA Convention on the safeguards).
- 165 See above, text relating to notes 16 to 18.
- 166 For the 1988 SUA Convention, see IMO Doc. LEG 107/8/5 of 9 January 2020, para. 8; for the 2005 SUA Convention, see IMO Doc. LEG 107/8/6 of 9 January 2020, para. 8.
- 167 See above, text relating to notes 95 to 97.
- 168 1988 SUA Convention, Art. 1; 2005 SUA Convention, Art. 1(1)(a).
- 169 1988 Fixed Platforms Protocol, Art. 1(3); 2005 Fixed Platforms Protocol, Art. 1(3).
- 170 See IMO Doc. SUA/CONF/CW/WP.18 of 3 March 1988, para. 1: “There was agreement that the two definitions [“ship” and “fixed platform”] should be complementary with no gaps, and that the definition of ‘ship’ should be as wide as possible.”
- 171 2005 SUA Convention, Art. 1(a).
- 172 In some provisions of the 1988 SUA Convention, the term “ship” denotes not only the victim ship, but also *other* categories of ships: Art. 8 allows the master of a private ship (but *not* a law enforcement official) of a state party to deliver suspects to the authorities of another state (see Petrig, note 130 at 43–44). Most likely, the delivery is made by the master of a private victim ship, which overpowered the attackers. Theoretically, however, the master of *any* private ship can do so if he gets hold of the suspect; e.g., if his or her ship assists the victim ship to defend against an attack. Since it is a sort of “private forum choice” or “private extradition” (see G. Plant “Legal aspect of terrorism at sea” in R. Higgins and M. Flory (eds) *Terrorism and International Law* (Routledge, London, 1997) 86), private ships, which are not victim ships, could be understood as a *de facto* “enforcer ships” or, alternatively, as belonging to the fourth category of “third ships.” Art. 13(2) obliges state parties to avoid a ship, its passenger, crew, or cargo being unduly detained or delayed due to the commission of an offence as defined in Art. 3 of the Convention. While only an offender ship can be detained, it is conceivable that, in addition to the victim ship, third ships are delayed due to the commission of an offence. The provisions’ wording does not allow one to determine with certainty to which category of ships it refers. While Art. 1 defines the term “ship” “[f]or the purposes of this Convention,” it does not apply to all references to “ships” in the Convention: For example, Art. 9 is a non-prejudice clause stipulating that the 1988 SUA Convention does not affect other rules of international law “pertaining to the competence of States to exercise investigative or enforcement jurisdiction on board *ships* not flying their flag” (emphasis added) (see Plant, *ibid.*, 83). The reference to “ship” is a reference to the notion as used in these *other* international rules and not limited to ships as defined in Art. 1 of the 1988 SUA Convention. The same holds true for Art. 2(2) containing another non-prejudice clause. Finally, Art. 2(1) defines ships not falling within the scope of application of the 1988 SUA Convention; consequently, the definition of “ship” as contained in Art. 1 is not relevant as regards the use of the term in Art. 2(1).
- 173 See, e.g., 1988 SUA Convention, Arts. 3(1)(a), (b), (c) and (d).
- 174 See, e.g., 2005 SUA Convention, Arts. 3bis(1)(a)(i)-(iii); on this new type of offense, see IMO Doc. LEG/191/INF.4 of 14 March 2014, 76.
- 175 See, e.g., 2005 SUA Convention, Arts. 3bis(1)(b)(i) and (ii).
- 176 See 2005 SUA Convention, Art. 3ter.
- 177 SUA Convention 2005, Art. 8bis; the 1988 SUA Convention was about the prevention, prosecution, and punishment of SUA offences, i.e., prescriptive and

- adjudicative jurisdiction, see Preambular, para. 6; on the enforcement layer of the 2005 SUA Convention, see Klein, note 161 at 173–175; J. Kraska and R. Pedrozo *International Maritime Security Law* (Martinus Nijhoff Publishers, Leiden, 2013) 821.
- 178 2005 SUA Convention, Art. 8*bis*(10)(d).
- 179 IMO Doc. LEG 106/WP.5 of 29 March 2019, para. 4.
- 180 Reaching the same conclusion: Klein, note 15 at 262; Kraska, note 18 at 13–14.
- 181 See above, note 170.
- 182 See below, text relating to notes 194 to 196.
- 183 See, e.g., 2005 SUA Convention, Art. 3*bis*(1)(a).
- 184 See, e.g., 2005 SUA Convention, Art. 3(1).
- 185 In similar terms: Kraska, note 18 at 10; Kraska and Pedrozo, note 177 at 802 and 804. See also IMO Doc. LEG 89/4/2 of 17 September 2004, para. 1, for the Mexican delegation’s statement during LEG 89, that “maritime security and the Rule of Law must be the prime considerations in revising the SUA Convention and Protocol.”
- 186 Documents on file with the author.
- 187 IMO Doc. LEG 107/8/5 of 9 January 2020, para. 8 (with regard to the 1988 SUA Convention); IMO Doc. LEG 107/8/6 of 9 January 2020, para. 8 (with regard to the 2005 SUA Convention).
- 188 See above, text relating to notes 46 and 47.
- 189 Secondary offences that, *inter alia*, cover attempted offences and aiding and abetting offences are not covered in this chapter; on secondary SUA offences, see Plant, note 172 at 81–82.
- 190 Since the 2005 SUA Convention expanded the list of offences as contained in the 1988 SUA Convention, this section only makes reference to the 2005 SUA Convention.
- 191 The first constellation described in Art. 3*bis*(1)(a)(i) of the 2005 SUA Convention (“uses against [...] a ship [...] any explosives”), is also a “harm against ship” offence; however, different from Art. 3, it requires a terrorist motivation.
- 192 IMO Doc. LEG/191/INF.4 of 14 March 2014, 61; T. Treves “The Convention for the Suppression of Unlawful Acts Against the Safety of Maritime Navigation” (1998) 2 *Singapore Journal of International & Comparative Law*, 544–545.
- 193 Except for sub-paragraphs (1)(a) of Art. 3 of the 2005 SUA Convention, it is required that the conduct in question “endangers” or “is likely to endanger” the safety of navigation of the victim ship. The element establishes a minimum threshold of potential harm that must be attained (see IMO Doc. LEG/191/INF.4 of 14 March 2014, 62). The scenario under consideration here – where explosives are discharged against a victim ship – seems to fulfill this element of the offence without further ado.
- 194 On the extent to which Art. 3 of the 2005 SUA Convention deviates from Art. 3 of the 1988 SUA Convention, see IMO Doc. LEG 101/INF.4 of 14 March 2014, 75–76.
- 195 M. Halberstam “Terrorism on the high seas: the Achille Lauro, piracy and the IMO Convention on Maritime Safety” (1988) 82 (2) *The American Journal of International Law*, 270.
- 196 On the two-ship-requirement, see Geiss and Petrig, note 105 at 62–63.
- 197 This issue has been raised in the context of the RSE; on the 1988 SUA Convention, see IMO Doc. LEG 107/8/5 of 9 January 2020, para. 5 (“there was a discussion if or how criminal liability extends to the remote operator”); on the 2005 SUA Convention, see IMO Doc. LEG 107/8/6 of 9 January 2020, para. 5 (*dito*). The IMO Secretariat identified the “role and responsibilities of

- the remote operator” even as belonging to those issues that “may constitute the main potential common gaps and/or themes” of the RSE of the treaties coming within the purview of the LEG: see IMO Doc. LEG 107/8/17 of 10 January 2020, para. 8 and Annex 1, containing a list of treaties where this issue accrues.
- 198 Plant, note 172 at 77.
- 199 This provides for the required transnational element; see *ibid.*, at 77–78.
- 200 Klein, note 15 at 262, reaches the same conclusion without, however, providing a reasoning.
- 201 On the first constellation described in Art. 3*bis*(1)(a)(i) of the 2005 SUA Convention (“uses against or on a ship”), see above, note 191.
- 202 See chapeau of Art. 3*bis*(1)(a); see also IMO Doc. LEG 101/INF.4 of 14 March 2014, 76.
- 203 IMO Doc. LEG 101/INF.4 of 14 March 2014, 77.
- 204 2005 SUA Convention, Art. 3*bis*(1)(a)(i) and (iii).
- 205 See above, text relating to notes 174 to 176.
- 206 IMO Doc. LEG 101/INF.4 of 14 March 2014, 78.
- 207 Klein, note 15 at 262, reaches the same conclusion.
- 208 *Ibid.*, at 261, rates the current use of autonomous offender ships as a “significant threat.”
- 209 There are major differences between piracy and the SUA offences in terms of enforcement and adjudicative jurisdiction, which are not discussed here; but see, e.g., Guilfoyle, note 159 at 377–378.
- 210 Words borrowed from Boister, note 136 at 23, who concludes with regard to “suppression conventions” in general that “the ‘crimes’ in the conventions are not ‘crimes’ at all.”
- 211 2005 SUA Convention, Art. 5.
- 212 Boister, note 136 at 23.
- 213 See Plant, note 172 at 80; he argues that the offenses “may differ somewhat.” However, if we compare, e.g., the Swiss and the German SUA implementing legislation, the differences are considerable: Germany included Art. 316c “Attacks on air and maritime traffic” in its Criminal Code, which reads: “Whoever 1. uses force or attacks a person’s decision-making freedom or engages in other practices in order to gain control over or influence the navigation of [...] a ship deployed in civil maritime traffic or 2. uses firearms or undertakes to cause an explosion or a fire in order to destroy or damage such an aircraft or ship or any cargo on board incurs a penalty [...]” Switzerland, by contrast, opined that SUA offences do not require the adoption of any new offences since the “ordinary” offences under the Swiss Criminal Code, such as offences against life and limb, property, public traffic, or against the state and national security, sufficiently cover the offences defined in the SUA Conventions (see Conseil fédéral (CH), Message relatif à la ratification d’une convention et à l’amendement d’une convention ainsi qu’à l’adhésion à deux protocoles de révision de l’ONU visant à combattre les actes terroristes contre la sécurité nucléaire et maritime du 7 décembre 2007, Feuille fédérale 2008 1041, 1085).
- 214 Boister, note 136 at 27.
- 215 Similar, but in relation to different rules, see Ringbom, note 16 at 164, stating that absent international regulatory guidance, there is the risk that (flag) states will interpret international requirements (in relation to international shipping) individually and differently; which, as per Ringbom, is justification enough to pursue international harmonization in that field.
- 216 Boister, note 136 at 23.