

A NEW INTERNATIONAL LEGAL FRAMEWORK FOR UNMANNED MARITIME VEHICLES?

ANDREA CALIGIURI

SUMMARY: 1. Introduction. – 2. Types of UMVs. – 3. The legal status of UMVs. – 3.1. UMV as “ship/vessel”. – 3.2. UMV as “device” or “equipment”. – 4. UMVs with lethal autonomous capabilities: legal implications for such characterization.

1. *Introduction*

Unmanned maritime vehicles (UMVs) in operation today are essentially used for marine scientific research and military purposes; however, their number has risen exponentially in recent years and so has the number of research projects aimed at developing the first unmanned merchant ships.¹ At least 40 countries have invested in important projects for developing UMVs employed in coastal surveillance and patrolling, in search and rescue operations, in the maritime industry and in combat operations.²

Potential benefits of these UMVs are many:

a) operational safety: reduction of the amount and severity of accidents due to both a lack of crew on-board and the better performance that unmanned vehicles deliver;

b) reduction of costs: it is estimated that crew costs typically account for around 20-30% of the total cost for a cargo ship journey; but UMVs may increase onshore costs in the form of large upfront investments and upkeep of control and operations centers, sensors, data servers and communication assets such as high-bandwidth satellites;

c) energy efficiency and environmental impact: removal of human crews would allow UMVs to be lighter in size, reducing fuel consumption and pollution;

d) security: UMVs can be constructed so that it is difficult to board them, with cargo access and manual controls made unavailable and, in the event of a piracy, control centers could immobilize the ship or have it sail a specific route until naval authorities can reach it; without the presence of a crew to hold hostage for ransom, a cargo ship should be less valuable target.

In combat operations, the reasons for employing UMVs are primarily the achievement of a military advantage and the reduction of human losses.

However, employment of UMVs implies many challenges concerning their international regulation. The aim of this paper is to discuss the various UMV status

¹ Several autonomous cargo ship projects were in development, the most prominent one is the construction of the *MV Yara Birkeland*, a project by Norwegian companies Kongsberg and Yara International.

² The growing importance of this technology has also been affirmed by the Chinese government in the launch of the “Vision for Maritime Cooperation under the Belt and Road Initiative” calling States to intensify cooperation in the field of unmanned vessels (see <www.xinhuanet.com/english/2017-06/20/c_136380414.htm>).

alternatives and the legal consequences of each potential status determination. Before developing this analysis, it seems useful to offer a classification of UUVs.

2. *Types of UUVs*

There is a range of terminology used when discussing UUVs depending on the degree of autonomy these maritime vehicles have (remotely-operated UUV or autonomous UUV), whether they are below or above the sea (unmanned underwater vehicle (UUV) or unmanned surface vehicle (USV)), and whether they are intended for commercial or military use.³

International law does not define UUVs. However, in this paper, for having a factual understanding of the legal issues, we will borrow the definition of UUVs from the 2017 *U.S. Commander's Handbook on the Law of Naval Operations*. This document defines unmanned surface vehicles (USVs) as follow:

“are watercraft that are either autonomous or remotely navigated and may be launched from surface, subsurface, or aviation platforms. The anticipated stealth, mobility, flexibility of employment, and network capabilities of USVs are expected to make them extremely valuable as force multipliers, particularly in the littoral environment. Potential missions envisioned for USVs include laying undersea sensor grids, antisubmarine warfare (ASW) prosecution, barrier operations, sustainment of carrier operating areas, mine countermeasures (MCM), intelligence, surveillance, and reconnaissance (ISR), bottom mapping and survey, and special operations support”

and it defines unmanned underwater vehicles (UUVs) as follow:

“underwater craft that are either autonomous or remotely navigated and may be launched from surface, subsurface, or aviation platforms. Towed systems, hard-tethered devices, systems not capable of fully submerging such as USV, semi-submersible vehicles, or bottom crawlers are not considered UUVs. The sea services may employ UUVs for a wide variety of missions, including, but not limited to: ISR, MCM, ASW, Surveillance, Inspection/Identification, oceanography, communication/navigation network nodes, payload delivery, information operations (IO), time critical strike, barrier patrol (homeland defense, antiterrorism/force protection), and barrier patrol (sea-base support)”.

Thus, in this paper, the term “unmanned” refers to both “remote controlled operation” as well as “autonomous operation”.

³ It is interesting to note that in China UUVs are mostly referred to as “intelligent ships”, defined as “ships which automatically perceive and obtain information and data on ship itself, marine environment, logistics and port by making use of sensors, communication, the Internet of Things, the Internet and other technical means, and achieve intelligent operation in terms of ship navigation, management, maintenance and cargo transportation based on computer technology” (see China Classification Society, *Rules for Intelligent Ships* (2015), para. 1.1.3, <www.ccs.org.cn/ccswzen/font/fontAction!downloadArticleFile.do?attachId=4028e3d65494918801569776b4f503e8>).

The analysis that follows is based upon an assumption that UMVs are separate entities from their deploying platform and, therefore, they have a separate and independent legal regime from the latter.

3. *The legal status of UMVs*

On 15 December 2016, the Chinese PLA Navy seized an unmanned underwater vehicle (UUV) controlled by an American ship, the *USNS Bowditch*, an oceanographic survey ship, 50 nautical miles in the Philippine economic exclusive zone (EEZ) in the South China Sea. China had not made it clear on what legal basis it acted, although statements attributed to the Chinese government associated the legality of the capture of the drone with the absence of clearly written rules, as well as to the provocation by the USA through repeated “reconnaissance” in waters over which China claims its jurisdiction.⁴ In response, the U.S. government called upon China to return the UUV immediately, stating that the *USNS Bowditch* and the UUV “were conducting routine operations in accordance with international law” and that the UUV was “a sovereign immune vessel of the United States”.⁵ The incident was finally resolved quickly and peacefully with the return of the drone about a week later.⁶

The *Bowditch* incident shows the uncertainty that exists in international law regarding the legal qualification of UMVs.

It is necessary to distinguish three main international regulatory areas from which the legal nature of UMVs can be inferred. First, there are rules on jurisdiction that establish the rights and obligations of States to take measures on ships; these rules are mainly set out in the UN Convention on the Law of the Sea (UNCLOS, 1982). Secondly, there are technical regulations concerning safety, environment training and watchkeeping standards etc., generally prescribed in conventions adopted by specialized UN agencies, such as, notably, the International Maritime Organization (IMO). Thirdly, there are a number of international standards in the field of private maritime law that have been established to harmonize issues such as the civil liability of shipowners for pollution, collisions or cargo-related losses and how such claims may be enforced.

The objective of this paper is to demonstrate that UMVs could be qualified as “ships” or “vessels” to which the existing customary and conventional international rules apply.

3.1. *UMV as “ship/vessel”*

In general, the variation between manned vehicles and unmanned vehicles, such as size of the means of propulsion, type of platform, capability, endurance, human versus

⁴ J. Borger, ‘Chinese warship seizes US underwater drone in international waters’ (16 December 2016) *The Guardian* <<https://www.theguardian.com/world/2016/dec/16/china-seizes-us-underwater-drone-south-china-sea>>.

⁵ Statement by Pentagon Press Secretary Peter Cook on Incident in South China Sea, 16 December 2016 <<https://www.defense.gov/Newsroom/Releases/Release/Article/1032611/statement-by-pentagon-press-secretary-peter-cook-on-incident-in-south-china-sea>>.

⁶ Statement by Pentagon Press Secretary Peter Cook on Return of U.S. Navy UUV, 19 December 2016 <<https://www.defense.gov/Newsroom/Releases/Release/Article/1034224/statement-by-pentagon-press-secretary-peter-cook-on-return-of-us-navy-uuv>>.

autonomous control and mission set, has not been regarded as a defining element of what constitutes a “vessel” or “ship.”

The 1982 UNCLOS uses the terms “ship” and “vessel” interchangeably, without providing a definition. Its Art. 91, which explicitly describes certain legal characteristics of a “ship”, underlines a “genuine link” that must exist between a State and its ship; this link is manifested through the granting by the State of its nationality to the ship, the registration in its territory and the right to fly its flag.

If these were the characteristics to define a ship, an UMV could be qualified as a ship because it generally has a nationality, is registered in the shipping registers of a State and flies a national flag.

A part of the doctrine has always believed that the absence of a definition of “ship” in UNCLOS was linked to the fact that it referred to the notion enclosed in maritime conventions which have an almost universal adhesion. However, it should be noted that the latter conventions provide varying definitions of “ship” or “vessel” that are functionally limited.

Some of these maritime conventions stress that a ship is used or capable of being used as a means of transportation on water;⁷ others provide a broad definition referring to any type of vessel;⁸ finally, the SALVAGE Convention states that “vessel” means any ship or craft, but also “any structure capable of navigation”.⁹

Since there is no universally accepted understanding of “means of transportation on water”, an UMV could fall within the notion of ship. Indeed, if it is assumed that transportation has a functional value, the functional definition could include transportation of payloads, weapons systems, or internal sensors and so U MVs, by design, meet this definition.¹⁰

There are some maritime conventions that accept a broad notion of ship, such as the SOLAS Convention, hence it is possible to assert that in principle U MVs may technically be regulated by SOLAS but, in practice, they are unable to comply with many of the Convention's rules, in particular with those provisions given by human-centered obligations.¹¹

⁷ See Rule 3 Convention on the International Regulations for Preventing Collisions at Sea (COLREGs, 1972); Art. 2 UN Convention on Registration of Ships (1986); Art. 1(d) Hague Rules (as amended by the Brussels Protocol 1968).

⁸ See e.g. in Art. 2(4) of the International Convention for the Prevention of Pollution from Ships (MARPOL, 1973), “ship” means a vessel of any type whatsoever operating in the marine environment and includes hydrofoil boats, air-cushion vehicles, submersibles, floating craft and fixed or floating platforms”. Obviously, this full definition includes unmanned ships. See also Art 1(6) Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention, 1972); Art. 2(3) International Convention on oil pollution preparedness, response and cooperation (1990); Art. 1 Convention for the Suppression of Unlawful Acts Against the Safety of Maritime Navigation (SUA, 1988). It is to note that the International Convention for the Safety of Life at Sea (SOLAS, 1974) does not give a single definition of ship or vessel, but “all ships” means any ship, vessel and crafts irrespective of type or purpose.

⁹ Art. 1(b) International Convention on Salvage (1989).

¹⁰ C. H. Allen, ‘Determining the Legal Status of Unmanned Maritime Vehicles: Formalism vs Functionalism’ (2018) 49 *Journal of Maritime Law and Commerce* 477, 496.

¹¹ L. Giunta, ‘The enigmatic juridical regime of unmanned maritime systems’, in *OCEANS 2015 – Genova*, (IEEE 2015) 1; Li Rui, ‘On the legal status of unmanned ships’ (2019) *China Oceans Law Review* 165.

From the above mentioned examples we could gather that it does not seem to be essential to defining a “ship” that it has a master or crew onboard, so UMVs would mostly be covered by existing regulatory definitions, and the existing conventions would continue to be functional for what concerns them.

However, the potentially confusing notion of “ship” or “vessel” does not contribute to defining the legal regime applicable to UMVs.

The problem is not negligible if the IMO is currently studying existing conventional instruments to assess how they could be applied to UMVs (see the so-called “Maritime Autonomous Surface Ships (MASS) project”).¹² Options under study are to amend the existing maritime conventions to include an explicit reference to MASS; to negotiate a new Convention covering all aspects of the existing maritime conventions but applicable to MASS; to define a MASS Code of Conduct referring to the relevant maritime conventions; or to apply the existing conventions to MASS by “equivalent”. The last option seems to be the most practicable, because amending existing conventions or negotiating a new convention would require a very long time frame for the creation of rules also applicable to UMVs. Nevertheless, the adoption of a Code of Conduct by the IMO could have little effect given the non-binding nature of such an instrument.

A more general argument can be made by recognizing an “evolutionary approach” to treaty interpretation. Under Art. 31(1) of the Vienna Convention on the Law of Treaties, a treaty must be interpreted in good faith and “in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose”. In this regard, the International Court of Justice has found that where a generic term is used – in that particular case, the term “commerce” – and where the relevant provision aims to settle a matter for an indefinite duration, treaty terms “must be understood to have the meaning they bear on each occasion on which the Treaty is to be applied, and not necessarily their original meaning”¹³. Thus, if, in the context of a treaty signed in the XIX century, the term “commerce” can be interpreted in an evolutive way to include “tourism”, it is reasonable to assume that the term “ship” under UNCLOS can include new types of ships as well as UMVs.¹⁴

¹² IMO initiated a regulatory scoping exercise for the use of MASS. These scoping exercises are conducted by the Maritime Safety Committee (see IMO, ‘Report of the Maritime Safety Committee on its 98th Session’ (28 June 2017) IMO Doc MSC 98/23, para 20) and the Legal Committee (see IMO ‘Report of the Legal Committee on the Work of its 105th Session’ (1 May 2018) IMO Doc LEG 105/14, para 11.7-11.11); each Committee considers the conventions falling within its purview. On the development of the MASS project, see Z. Pietrzykowski and J. Hajduk, ‘Operations of Maritime Autonomous Surface Ship’ (2019) 13 *The International Journal on Marine Navigation and Safety of Sea Transportation* 725.

¹³ See International Court of Justice, *Costa Rica v Nicaragua (Dispute Regarding Navigational and Related Rights)* (2009) I.C.J. Reports 213, paras. 70-71.

¹⁴ Concerning the use of an “evolutionary approach” to interpret the UNCLOS, see International Tribunal of the Law of the Sea, *Request for an advisory opinion submitted by the Sub-Regional Fisheries Commission (SRFC)*, Advisory Opinion of 2 April 2015, Separate Opinion of Judge Lucky, para. 18: “[...] The 1982 Convention and the Statute of the Tribunal are “living instruments”. This means that they “grow” and adapt to changing circumstances. An act/statute is always “speaking”. The law of the sea is not static. It is dynamic and, therefore, through interpretation and construction of the relevant articles a court or tribunal can adhere and give positive effect to this dynamism. Since 1982, technology has advanced and therefore in my view judges must take a robust approach and apply the law in a legal but pragmatic way. [...]”.

This evolutive approach also responds to State practice expressed in national legislation and regulations¹⁵ and in international fora. For instance, the IMO MASS project demonstrates that a broad majority of IMO member-States believe that at least some UUVs, the USVs, are “ships” and this view is confirmed by the majority of national maritime law associations which participated in the “Questionnaire on Unmanned Ships” proposed by the *Comité Maritime International* in 2017, which focused their responses on whether unmanned ships would be subject to UNCLOS and thus subject to the same rights and duties of manned ships.¹⁶

If UUVs can be considered ships or vessels, they must comply with UNCLOS navigation rules.

The entitlement to navigational rights appears strategically advantageous for those States with the capability to build and deploy UUVs on a large scale. For example, Articles 17 and 52 UNCLOS recognize the right of innocent passage, defined as a continuous and expeditious traversing of the territorial sea or archipelagic waters in a manner not prejudicial to the peace, good order, or security of the coastal or archipelagic State.¹⁷ Here, when UUVs are exercising this right in compliance with the applicable law of the sea requirements, the coastal State may not prevent or interfere with their passage through its territorial or archipelagic waters.

UUVs also enjoy all other navigational rights in accordance with the international law of the sea: the transit passage in straits used for international navigation,¹⁸ the archipelagic sea lanes passage¹⁹ and the freedom of navigation in the EEZs²⁰ and in the high seas.²¹

However, the drone revolution has arrived at a period of intense maritime tension between several States; a period during which the navigation rules of the law of the sea are subject to interpretations that are not always well-accepted by all States. For instance, restrictions imposed by coastal States to navigation rights of foreign ships must be noted: a number of States require prior notification before a foreign warship may conduct innocent passage through their territorial waters; other States prohibit the passage of ships carrying nuclear and other weapons of mass destruction through their territorial seas, at least eighteen States purport to regulate or prohibit foreign military activities in their EEZs and a growing number of coastal States passed legislations and enacted unilateral measures to increase their control over the portion of waters of

¹⁵ See, e.g., legislation of Belgium (Act of 21 December 1990 on the registration of ships, s.1(1)), England and Wales (Merchant Shipping Act 1995, s.313), France (Code des Transports, Art L.5000-2), Greece (Code of Public Maritime Law, Art. 3), The Netherlands (Burgerlijk Wetboek (BW), Book 8, Art 194), Poland (Maritime Code of 2001, Art 2(1)), Spain (Commercial Registration Regulation 1597/1989), Sweden (Maritime Code, s. 2) and USA (US Code-Rules of Construction Act, Title 1, para. 3). See also Chinese regulations (China Classification Society, *Rules for Intelligent Ships* (2015) and *Guidelines for Autonomous Cargo Ships* (2018)).

¹⁶ On the text of the Questionnaire and the Responses to the Questionnaire, see <<https://comitemaritime.org/work/mass>>. In particular, see responses by Dutch, Finnish, French, German, Panamanian and US maritime law associations.

¹⁷ See Articles 18 and 19 UNCLOS.

¹⁸ Art. 38 UNCLOS.

¹⁹ Art. 53 UNCLOS.

²⁰ Art. 58(1) UNCLOS.

²¹ Art. 87 UNCLOS.

international straits within the limit of their maritime zones. All these restrictions are supposed to be extended to UUVs.

3.2. UUV as “device” or “equipment”

If an UUV, by design, cannot be considered a “ship” or a “vessel” under the law of the sea, it could be considered something else, such as a “device” or “equipment”.

UNCLOS Part XII, entitled “Protection and preservation of the marine environment”, refers to “device” in two provisions.

Art. 194(3), concerning measures to prevent, reduce and control pollution of the marine environment, designs these measures to minimize to the fullest possible extent, in its letter c), “pollution from installations and devices used in exploration or exploitation of the natural resources of the seabed and subsoil” and, in its letter d), “pollution from other installations and devices operating in the marine environment”.

Art. 209(2), concerning pollution from activities in the Area, affirms that “States shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment from activities in the Area undertaken by vessels, installations, structures and other devices flying their flag or of their registry or operating under their authority, as the case may be”.

The wording of the two provisions suggests that some UUVs could fall under these provisions.²²

In Part XIII, entitled “Marine Scientific Research”, UNCLOS refers to “equipment”. In particular, Art. 261 states that the deployment and use of any type of scientific research installations or equipment “shall not constitute an obstacle to established international shipping routes” and Art. 262 affirms that “Installations or equipment [...] shall bear identification markings indicating the State of registry or the international organization to which they belong and shall have adequate internationally agreed warning signals to ensure safety at sea and the safety of air navigation, taking into account rules and standards established by competent international organizations”.

Some UUVs used for marine scientific research purposes could undoubtedly be included among the “equipment” referred to in Part XIII.²³ However, their use is subject to certain restrictions, such as the obligation to provide information to the coastal state when operating in its EEZ or on its continental shelf according to Art. 248(b) and (d).

Some UNCLOS provisions define with a little room of ambiguity the legal regime of “device” and “equipment” in relation to navigation rights, establishing significant limits in the exercise of these rights.

For the right of innocent passage, two UNCLOS provisions are illustrative:

²² Some UUVs could inspect oil and gas platforms in very deep waters; see e.g. the use of Saipem’s Underwater Intervention Drone (UID) Hydrone-R and the all-electric Work Class ROV Hydrone-W in the Njord Field development <<https://www.saipem.com/en/projects/hydrone-njord-field-development>>.

²³ Examples of small UUVs employed for this purpose are “Saildrone” (it is a USV produced by the company Saildrone) and “Wave Glider” (unmanned robots produced by Liquid Robotics, a wholly owned subsidiary of The Boeing Company) for data collection in the fields of meteorology, oceanography, fisheries, tsunami and seismic monitoring and offshore operations monitoring.

a) Art. 17 concerning the discipline of this right makes clear that it is only available for maritime vehicles which can be qualified as “ships”;²⁴

b) Art. 20, which seems to entitle to some specific UMVs – UUVs – to exercise the right of innocent passage, provides that submarines “and other underwater vehicles” must operate on the surface and show their flag while in a foreign territorial sea. Thus, UUVs could be qualified as “other underwater vehicles” according to the UNCLOS; but Art. 20 is to be interpreted enclosed with Art. 17.

As with innocent passage, there is no support in UNCLOS for the proposition that a non-vessel “device” or “equipment” is entitled to exercise the right of transit passage in straits used for international navigation²⁵ and the archipelagic sea lanes passage,²⁶ both being regimes established for “ships”.

However, when UMVs – as devices or equipment – operate on or under the high seas and in EEZs, there is little doubt that their use cannot be restricted.

4. *UMVs with lethal autonomous capabilities: legal implications for such characterization*

What happens if UMVs with lethal autonomous capabilities are operated by or under the exclusive control of the armed forces? Could they be qualified as “warships” under the law of the sea? What happens if they are merely military “devices” or “equipment”?²⁷

Without the right to exercise navigational regimes available to “warships” granted by the law of the sea, the utility of UMVs to national navies would be significantly limited.

UNCLOS, in Art. 29, defines “warship” as:

“[a] ship belonging to the armed forces of a State bearing the external marks distinguishing such ships of its nationality, under the command of an officer duly commissioned by the government of the State and whose name appears in the appropriate service list or its equivalent, and manned by a crew which is under regular armed forces discipline.”²⁸

²⁴ M. Nordquist (ed.), *United Convention on the Law of the Sea 1982 - A Commentary* (Vol. II, Martinus Nijhoff 2002), 180 ff.

²⁵ See above (n 18).

²⁶ See above (n 19).

²⁷ For commentary on the debate surrounding this issue, see M. N. Schmitt and D. S. Goddard, ‘International law and the military use of unmanned maritime systems’ (2016) 98 *International Review of the Red Cross* 567; R. Veal, M. Tsimplis, H. Nasu and D. Letts, ‘The Legal Characterization of Lethal Autonomous Maritime Systems: Warship, Torpedo, or Naval Mine?’ (2020) 96 *International Law Studies* 79; Y. Saito, ‘Reviewing Law of Armed Conflict at Sea and Warfare in New Domains and New Measures: Submarine Cables, Merchant Missile Ships, and Unmanned Marine Systems’ (2019) 44 *Tulane Maritime Law Journal* 107; R. McLaughlin, ‘Unmanned Naval Vehicles at Sea: USVs, UUVs, and the Adequacy of the Law’, (2011/2012) 21 *Journal of Law, Information and Science* 100; D. Amoroso, ‘Jus in bello and jus ad bellum arguments against autonomy in weapons systems: A reappraisal’ (2017) 43 *QIL – Questions of International Law* 5 <<http://www.qil-qdi.org/jus-bello-jus-ad-bellum-arguments-autonomy-weapons-systems-re-appraisal>>.

²⁸ This definition is derived from the 1958 Geneva Convention on the High Seas (Art. 8(2)), which in turn relied upon the definition used in the 1907 Hague Convention VII relating to the Conversion of Merchant Ships into Warships (Articles 1-4). The term warship includes submarines and surface ships,

At first glance, according to a literal interpretation, the UNCLOS provision suggests that UMVs are precluded from having the legal status of warships because there is no duly commissioned officer authorized to take command or a crew physically present on board.

In light of the limits imposed by UNCLOS to qualify a “warship”, some scholars²⁹ have however suggested to look for the meaning of warship in customary international law and, in particular, accepting a broad notion of warship that would derive from an application by analogy of the concept of “military aircraft”.³⁰

On the contrary it might be argued that an UMV must be qualified as “other government ship operated for non-commercial purposes” and as such it would enjoy the same legal status of a warship under UNCLOS. In particular, according to Art. 31 UNCLOS, the flag State shall bear international responsibility for any loss or damage to the coastal State resulting from the non-compliance by an UMV, which is a government ship operated for non-commercial purposes, with the laws and regulations of the coastal State concerning passage through the territorial sea or with the provisions of UNCLOS or other rules of international law, and according to Art. 32 UNCLOS, an UMV, which is a government ship operated for non-commercial purposes, shall enjoy sovereign immunity.³¹

This interpretation complies with UNCLOS because the latter Convention does not give a notion of “other government ship operated for non-commercial purposes”.

This interpretation is, for example, endorsed by the USA in the *Commander's Handbook on the Law of Naval Operations*. In this document, USVs and UUVs that are engaged exclusively in governmental, non-commercial service are covered by sovereign immunity and it is specified that their status is not dependent on the status of their launch platform.³²

The issue of sovereign immunity becomes more difficult to resolve if UMVs do not qualify as ships; thus, for example, the *German Commander's Handbook* takes the position that UMVs enjoy sovereign immunity status to the extent that they are controlled from a ship which itself enjoys such status.³³

as well as Coast Guard vessels that belong to the armed forces of the State (see 1995 San Remo Manual on International Law applicable to Armed Conflict at Sea).

²⁹ A. Norris, *Legal Issues Relating to Unmanned Maritime Systems* (U.S. Naval War College 2013) <<https://www.hsdl.org/?view&did=731705>>, 27 ff.

³⁰ See Rule 1(x) of the *HPCR Manual on International Law Applicable to Air and Missile Warfare* (2009); this provision affirms: “Military aircraft’ means any aircraft (i) operated by the armed forces of a State; (ii) bearing the military markings of that State; (iii) commanded by a member of the armed forces; and (iv) controlled, manned or preprogrammed by a crew subject to regular armed forces discipline”. This provision extends to all unmanned aerial vehicles, whether unarmed (UAV) or armed (UCAV), and whether remotely piloted or operating autonomously (see *Commentary on the HPCR Manual on International Law Applicable to Air and Missile Warfare* (2010), par. 6, p. 47).

³¹ See also Art. 96 UNCLOS.

³² *Commander's Handbook on the Law of Naval Operations* (2017), para. 2.3.6 (Unmanned Surface Vehicle/Unmanned Underwater Vehicle Status).

³³ *German Navy, Commander's Handbook: Legal Bases for the Operations of Naval Forces*, SM 3, 2002, 45.

If a military UMV can be qualified as a “government ship operated for non-commercial purposes”, like a “warship”, it is entitled to all the navigational rights granted by UNCLOS.

Another consequence of the UMV status as “government ship” could be in the entitlement to perform certain important maritime functions when it is clearly marked and identifiable as being on government service and authorized to that effect,³⁴ including carrying out a seizure on account of piracy,³⁵ conducting a right of visit boarding³⁶ and engaging in hot pursuit of a foreign ship or its boats.³⁷ However, UMVs are able to perform only some components of these maritime functions. It is important to distinguish the vessel-like components of these maritime functions from the crew-like components. Thus, while a State may use UMVs to conduct some of the vessel-like functions (i.e. carrying a boarding team, conducting surveillance, pursuing a fleeing vessel, signaling such a vessel to stop), it cannot use these UMVs to carry out the crew-like components of these functions (i.e. physically boarding a vessel, conducting inquiries, conducting searches, seizures, and arrests).

In contrast, UMVs, qualified as military devices or equipment, are not entitled to exercise navigation rights in accordance with the UNCLOS,³⁸ except for the freedom of navigation in high seas and EEZs. Additionally, there is no question as to the impossibility for UMVs, qualified as military devices or equipment, to be entitled to perform those important maritime functions expressly reserved for warships and other duly authorized ships.

Nevertheless, the legal status of “warships” is clearly distinct from “other governmental ships” during an international armed conflict in that only warships are entitled to exercise belligerent rights.³⁹

Assuming the validity of this principle, it further follows that only warships could be directly targetable by opposing belligerent forces; otherwise, as a non-warship, an UMV may be stopped, visited, and searched,⁴⁰ and also seized⁴¹ if of enemy nationality, but not attacked as a measure of first resort. This limitation on attack of a non-warship does not preclude such a vessel/craft from defending itself if attacked.⁴² However, any participation in hostilities in any manner whatsoever by a non-warship subjects it to attack by a belligerent warship.⁴³ In addition, if the interpretation of the term

³⁴ For an in-depth analysis on this topic, see N. Klein, ‘Maritime Autonomous Vehicles within the International Law Framework to Enhance Maritime Security’ (2019) 95 *International Law Studies Series* 244.

³⁵ Art. 107 UNCLOS.

³⁶ Art. 110 UNCLOS.

³⁷ Art. 111 UNCLOS.

³⁸ See Art. 19(f) UNCLOS, which clearly affirms that passage of a foreign ship in territorial waters of a third State shall be considered to be prejudicial to the peace, good order or security of the coastal State if in the territorial sea it engages in “the launching, landing or taking on board of any military device”. Thus, an UMV as military device has no right to an innocent passage.

³⁹ See *Manual of the Laws of Naval War, adopted by the International Institute of International Law*, 9 August 1913. Although this manual is not a treaty, its provisions are largely reflective of customary international law.

⁴⁰ Art. 32, *Manual of the Laws of Naval War* (1913).

⁴¹ Art. 33, *Manual of the Laws of Naval War* (1913).

⁴² Art. 12, *Manual of the Laws of Naval War* (1913).

⁴³ Art. 49, *Manual of the Laws of Naval War* (1913).

“hostilities” in the aviation realm carries over to the maritime realm, even the collection of information by an UMV could subject it to attack by an enemy warship.

Although it is difficult to characterize UMVs as warships, an UMV could be a “means of warfare” (weapons and weapons systems) as a “device” or “equipment” to the extent that it is capable of engaging in an activity which qualifies as an “attack”, such as anti-surface, anti-submarine or mine-laying operations.

Art. 36 of the Additional Protocol I to the Geneva Conventions and relating to the Protection of Victims of International Armed Conflicts (AP I) provides that:

“In the study, development, acquisition or adoption of a new weapon, means or method of warfare, a High Contracting Party is under an obligation to determine whether its employment would, in some or all circumstances, be prohibited by this Protocol or by any other rule of international law applicable to the High Contracting Party”.

According to this provision, the High Contracting Parties undertake determining the possible prohibition of a new weapon, both with regard to the provisions of the Protocol and any other applicable rules of international law, on the basis of the normal use foreseen at the time of the evaluation.

The purpose of Art. 36 is to ask States whether the normal or intended use of a new weapon would be unlawful in some situations or in all circumstances. A State is not required to foresee or study all possible misuses of the weapon in question, since almost all weapons could have misuses that are prohibited.⁴⁴

The employment of UMVs as “means of warfare” entails the compliance with principles and rules of law of armed conflicts concerning the conduct of hostilities,⁴⁵ in particular, distinction, proportionality, and the obligation to take all feasible precautions.⁴⁶

A party to the conflict employing an UMV to conduct an attack must assess whether that attack is directed at a lawful target. A special regime for “military objectives” exists at sea.⁴⁷ Certain ships are immune from direct attack, protected from indiscriminate attack, included in proportionality calculations, and considered vis-à-vis the requirement to take precautions in attack during maritime operations.⁴⁸

⁴⁴ It must be noted that there are some problems for applying international humanitarian law, in particular concerning its prohibitions, when UMVs are qualified as “devices”, for example as “torpedoes” or “naval mines”. On this issue, see Veal, Tsimplis, Nasu and Letts (n 27).

⁴⁵ See *San Remo Manual on International Law Applicable to Armed Conflicts at Sea*, 12 June 1994. Although this manual is not a treaty its provisions are largely reflective of customary international law.

⁴⁶ See respectively Rules 39, 41 and 46.

⁴⁷ See Rule 47, *San Remo Manual*.

⁴⁸ Art. 57(4), Additional Protocol I: “In the conduct of military operations at sea or in the air, each Party to the conflict shall, in conformity with its rights and duties under the rules of international law applicable in armed conflict, take all reasonable precautions to avoid losses of civilian lives and damage to civilian objects”.