

# Classification of Unmanned Maritime Systems by FVEY Countries



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## I. Introduction

As unmanned systems (UxS) permeate the maritime environment, it becomes increasingly evident that existing policy lags far behind technological advances. Taking effect in 1982, the most commonly accepted regulatory policy on the high seas is the United Nations Convention on the Law of the Sea (UNCLOS).<sup>1</sup> UNCLOS provisions have an underlying assumption that ships and vessels (terms used interchangeably in the agreement) must be manned.<sup>2</sup> Because UNCLOS fails to explicitly define either of these terms, it is unclear whether or not its provisions apply to unmanned maritime systems, which could also be interpreted as devices. Lacking an international classification of UxS as ships or vessels, the precedents that nations set through their own domestic policies and treatment of UxS become increasingly important in determining treatment of UxS in the maritime environment.<sup>3</sup> Whether UxS are considered ships or vessels, or if they fall into a separate category, dictates whether UxS are required to follow certain rules and whether they receive specific protections. The development of technology, its productive use, and the safety of the maritime environment depend on the existence and implementation of clear laws and policies. This report explores the following key elements of the classification of UxS in the maritime environment:

- 1) Current international and Five Eyes Alliance (FVEY) members' definitions of vessels and ships;
- 2) Whether UxS fall within these definitions;

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<sup>1</sup> UN General Assembly, Convention on the Law of the Sea, Article 29. (1982). [https://www.un.org/depts/los/convention\\_agreements/texts/unclos/unclos\\_e.pdf](https://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf)

<sup>2</sup> **Laws that imply manning or apply questionably to UxS are detailed extensively in this article.** Comite Maritime International. (2018). CMI International Working Group Position Paper on Unmanned Ships and the International Regulatory Framework. *Comite Maritime International*. <https://comitemaritime.org/wp-content/uploads/2018/05/Summary-of-Responses-to-the-CMI-Questionnaire.docx>

<sup>3</sup> Schmitt, M., & Goddard, D. R. (2016). International law and the military use of unmanned maritime systems. *International Review of the Red Cross*, 98(902), 567–592. <https://doi.org/10.1017/s1816383117000339>

- 3) Current international and FVEY classifications of UxS, or lack thereof; and
- 4) The implications of these classifications (or lack thereof).

In the context of recent seizures of U.S. UxS by Iran and China, the classification of these systems is relevant and time sensitive.<sup>4,5</sup> The findings of this report elucidate the terminology used and precedents set by FVEY countries to clarify the legal environment and how UxS will be treated under international law.

Research relevant to this analysis include a plethora of legal and policy, from treaties to military handbooks to ship registration regulations. For this report, a nation has defined the terms “ship” or “vessel” when the term(s) is included in the laws or policies that apply broadly to their coastal waters, territorial waters, or exclusive economic zone, promulgated by the regulatory body in charge of that area (e.g., the U.S. Code of Law, the Canada Shipping Act of 2001, etc.). Specific treaties often have narrow definitions that only make sense in their specific context which don’t necessarily offer clarity of legal treatment for UxS.<sup>6</sup> Given the ambiguity among states’ treatment of UxS, a broader approach to researching the issue is needed including examining a wide variety of documents and statements to gauge nations’ stances on the status of UxS as ships or vessels.

## **II. Definitions of “Ship” and “Vessel” Among FVEY Nations**

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<sup>4</sup> *Iran Seizes and Later Releases Two U.S. Navy Unmanned Surface Vessels*. (2022, September 4). The Maritime Executive. <https://maritime-executive.com/article/iran-seizes-and-later-releases-two-u-s-navy-unmanned-surface-vessels>

<sup>5</sup> The National Bureau of Asian Research. (2021). *The Implications of China’s Seizure of a U.S. Navy Drone - The National Bureau of Asian Research (NBR)*. The National Bureau of Asian Research (NBR). <https://www.nbr.org/publication/the-implications-of-chinas-seizure-of-a-u-s-navy-drone/>

<sup>6</sup> McKenzie, S. (2020). When is a Ship a Ship? Use by State Armed Forces of Un-crewed Maritime Vehicles and the United Nations Convention on the Law of the Sea. *Melbourne Journal of International Law*, 21. <https://doi.org/10.31228/osf.io/a7xtc>

UNCLOS provisions apply to either “vessels” or “ships,” neither of which are defined in the policy. Many nations have delineated between the two terms. As the IMO considers rules to fill the gaps under UNCLOS, it is necessary to understand the current global consensus on the definitions of these terms and whether a common definition may be attained.<sup>7</sup> In the absence of international agreement, the precedent set by nations’ definition of “ship” or “vessel” and whether UxS is included will influence the definition that the IMO eventually uses in its rules. This report focuses on FVEY countries, as they are incorporating UxS technology into their fleets and exert significant political influence internationally.

### **A. Vessels**

Ships and vessels are referred to interchangeably in UNCLOS and lack formal definitions. It is useful, however, to note that the term “vessel” has been defined in other internationally accepted policies. The Convention on the International Regulation for Preventing Collisions at Sea (COLREGs) defines a vessel as “includ[ing] every description of watercraft, including non-displacement craft, wing-in-ground-effect (WIG) craft and seaplanes, used or capable of being used as a means of transportation on water.”<sup>8</sup> The following section discusses FVEY definitions for the term “vessel.”

In the U.S. Code, “vessel” is defined broadly in Title 1 as “every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water.”<sup>9</sup> “Vessel” is also defined in U.S. Code Title 47 and is equated to the term “ship,” and

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<sup>7</sup> International Relations and Defence Committee. (2021). *Corrected oral evidence: UNCLOS: Fit for purpose in the 21st century?* (HL 2021). [Online]. London. [Accessed 03 June 2023]. <https://committees.parliament.uk/oralevidence/3000/pdf/>

<sup>8</sup> International Maritime Organization. (1972, October 20). *Convention on the International Regulations for Preventing Collisions at Sea*. Rule 3. [https://opanalytics.ca/courses/mod/page/view.php?id=7#:~:text=\(a\)%20The%20word%20%E2%80%9Cvessel,means%20of%20transportation%20on%20water](https://opanalytics.ca/courses/mod/page/view.php?id=7#:~:text=(a)%20The%20word%20%E2%80%9Cvessel,means%20of%20transportation%20on%20water)

<sup>9</sup> Rules of Construction, 1 U.S.C. § 3. (1947). <https://www.law.cornell.edu/uscode/text/1/3>

uses the exact wording as the first definition except that it excludes aircraft.<sup>10</sup> Interestingly, even in the same code of law, there is ambiguity regarding the distinction between a “vessel” and a “ship.”

In the U.K., the Merchant Shipping Act of 1894 defines a vessel as “includ[ing] any ship or boat, or any other description of vessel used in navigation,” circularly using the term vessel in its own definition.<sup>11</sup> The more recent Merchant Shipping Act of 1995 does not include a definition for the term “vessel.”

Australia has two main legislative frameworks— one for ships that travel internationally (Regulated Australian Vessels) and another for ships that operate exclusively within the Australian Exclusive Economic Zone (Domestic Commercial Vessels). Regulated Australian Vessels fall under the Navigation Act of 2012, while Domestic Commercial Vessels are regulated by the Marine Safety National Law Act of 2012.<sup>12</sup> The Navigation Act defines a vessel as “any kind of vessel used in navigation by water, however propelled or moved, and includes the following: (a) a barge, lighter or other floating craft; (b) an air-cushion vehicle, or other similar craft, used wholly or primarily in navigation by water.”<sup>13</sup> In the Marine Safety National Law Act, a vessel is defined as “a craft for use, or that is capable of being used, in navigation by water, however propelled or moved, and includes an air-cushion vehicle, a barge, a lighter, a submersible, a ferry in chains and a wing-in-ground effect craft.”<sup>14</sup> It is notable that the first

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<sup>10</sup> Definitions, 47 U.S.C. § 153. (1954).

<https://www.law.cornell.edu/uscode/text/47/153#:~:text=The%20term%20%E2%80%9Caffiliate%E2%80%9D%20means%20a,or%20control%20with%2C%20another%20person.>

<sup>11</sup> Merchant Shipping Act of 1894, c. 60 sec 742. [https://www.legislation.gov.uk/ukpga/1894/60/pdfs/ukpga\\_18940060\\_en.pdf](https://www.legislation.gov.uk/ukpga/1894/60/pdfs/ukpga_18940060_en.pdf)

<sup>12</sup> Australian Maritime Safety Authority. *Advisory note—The scope of the National System: Regulated Australian vessels and domestic commercial vessels*. (2015). <https://www.amsa.gov.au/vessels-operators/domestic-commercial-vessels/advisory-note-scope-national-system-regulated>

<sup>13</sup> *Navigation Act 2012*. (Cth). Pt IV div 1. <https://www.legislation.gov.au/Details/C2012A00128>

<sup>14</sup> *Marine Safety National Law Act 2012*. (Cth). Pt I div 8. <https://www.legislation.gov.au/Details/C2016C00377>

Navigation Act defines “vessel” circularly, using the term in its own definition, while the Marine Safety National Law does not.

The Canada Shipping Act of 2001, the umbrella act under which more specific maritime provisions fall, defines a vessel as “a boat, ship or craft designed, used or capable of being used solely or partly for navigation in, on, through or immediately above water, without regard to method or lack of propulsion, and includes such a vessel that is under construction. It does not include a floating object of a prescribed class.”<sup>15</sup>

New Zealand’s primary marine policy, the Maritime Transport Act of 1994, does not provide a definition for the term “vessel.”

## **B. Ships**

The term “ship” is not defined in UNCLOS but is defined in the International Convention for the Prevention of Pollution from Ships (MARPOL). MARPOL defines ships as “a vessel of any type whatsoever operating in the marine environment....”<sup>16</sup> While this is an example of an international definition in the absence of one in UNCLOS, it is much broader than usual, as pollution regulations aim to include as wide a range of watercraft as possible. Each of the FVEY countries also has a definition for the term “ship.”

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<sup>15</sup> *Canada Shipping Act 2001*, RSC 2001, C Interpretations, s 2. <https://laws-lois.justice.gc.ca/eng/acts/C-10.15/page-1.html#h-50749>

<sup>16</sup> International Maritime Organization. (1973). *International Convention for the Prevention of Pollution from Ships*. Art 2 sec 4. <https://wwwcdn.imo.org/localresources/en/KnowledgeCentre/ConferencesMeetings/Documents/MARPOL%201973%20-%20Final%20Act%20and%20Convention.pdf>

In the U.S., “ship” and “vessel” are defined interchangeably in the U.S. Code of Law as mentioned in the previous section on vessels. The only difference between the definition of “vessel” and that of a “vessel or ship” is that ships do not include aircraft.<sup>17</sup>

The U.K.’s Merchant Shipping Act of 1995 defines “ship” as “every description of vessel used in navigation.”<sup>18</sup> Since the Merchant Shipping Act of 1995 does not define a vessel, we can reasonably assume that it references back to the 1894 act, which does define the term.

Problematically, the 1894 definition of “vessel” is a “ship... used in navigation.”<sup>19</sup> As a result, a ship is a type of vessel, while a vessel is also a type of ship under U.K. law.

Neither of Australia’s main governing maritime policies, the Navigation Act of 2012 and the Marine Safety National Law Act of 2012, contain a definition for ship.<sup>20</sup> The Australian Shipping Registration Act of 1981, however, does provide a definition for “ship” as “any kind of vessel capable of navigating the high seas...” and includes various examples to clarify items that can be defined as ships.<sup>21</sup>

In the Canadian Shipping Act of 2001, there is no provided definition for “ship.” In the Canada Marine Act, a regulation administered by Transport Canada (the government’s commercial regulatory body), it is defined as “every description of vessel, boat or craft designed, used or capable of being used solely or partly for marine navigation, whether self-propelled or not and without regard to the method of propulsion, and includes a sea-plane and a raft or boom of logs or lumber.”<sup>22</sup>

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<sup>17</sup> Definitions, 47 U.S.C. § 153. (1954).

<https://www.law.cornell.edu/uscode/text/47/153#:~:text=The%20term%20E2%80%9Caffiliate%E2%80%9D%20means%20a,or%20control%20with%2C%20another%20person.>

<sup>18</sup> Merchant Shipping Act of 1895, c. III sec 313. <https://www.legislation.gov.uk/ukpga/1995/21/data.pdf>

<sup>19</sup> Merchant Shipping Act of 1894, c. 60 sec 742. [https://www.legislation.gov.uk/ukpga/1894/60/pdfs/ukpga\\_18940060\\_en.pdf](https://www.legislation.gov.uk/ukpga/1894/60/pdfs/ukpga_18940060_en.pdf)

<sup>20</sup> *Marine Safety National Law Act 2012*. (Cth). Pt I div 8. <https://www.legislation.gov.au/Details/C2016C00377>

<sup>21</sup> *Shipping Registration Act 1981*. (Cth). Pt I sec 3. <https://www.ilo.org/dyn/natlex/docs/ELECTRONIC/88621/101412/F-915920895/AUS88621%202019.pdf>

<sup>22</sup> *Canada Marine Act*, RSC 1998. C Interpretation, s 2. <https://laws-lois.justice.gc.ca/eng/acts/c-6.7/FullText.html>

In New Zealand, under the Maritime Transport Act of 1994, “ship” is defined as “every description of boat or craft used in navigation, whether or not it has any means of propulsion...” and include examples of items that are to be considered ships.<sup>23</sup>

### **III. Complexity of Defining UxS**

Given that the FVEY countries have defined "vessel" and "ship", the next step in the analysis is whether or not UxS fall within these definitions and can be categorized as such. Every country, excluding New Zealand and Australia's Marine Safety National Law, uses the term “vessel” in their definition of a ship, so this analysis will focus on how an UxS can be classified as a vessel. New Zealand's definition for “ship” will be used because its law lacks a definition for “vessel”. Most seem fairly broad and inclusive of UxS at the surface level, but there are various nuances within each definition.

The first issue arises in the existence of multiple definitions of “vessel”, which use the term to define itself. The circular nature of these definitions makes it very difficult to determine whether or not they are inclusive of UxS. In order to ascertain whether or not UxS are vessels, other requirements that are common between all FVEY definitions may help, regardless of whether or not they use the word “vessel.” The main specifications are that (1) a vessel is in or on the water in some capacity and (2) they are either capable of or are being used for navigation or transportation. There is little debate over whether or not UxS satisfies the first condition of being in or on the water. The second condition, what classifies use for navigation or transportation, is less clear.

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<sup>23</sup> Maritime Transport Act 1994. Pt 1 sec 2. <https://legislation.govt.nz/act/public/1994/0104/latest/DLM334660.html>



For example, in the U.S. Code of Law’s definition of “transportation” provided in Chapter 51, Transportation of Hazardous Material– “the movement of property and loading, unloading, or storage incidental to the movement.” Purely based on the U.S. definition of “vessel” and this definition of “transportation,” a small UxS that looks nothing like a typical vessel could be defined as such, even if all it is “transporting” is a small sensor, like the Wave Glider.<sup>24</sup> However, a narrow definition of “transportation” could have excluded the Wave Glider if it implied the carrying of people or goods, or had some implication or requirement of the intentional movement of objects from a start point to an end point (which a sensor does not necessarily do). The way “navigation” is defined could also exclude various UxS; there are certain propulsion requirements for navigation that may not be met because some UxS move passively through their environment.

It has been up to individual nations to interpret these definitions (determining whether UxS are registered as ships or vessels) and apply their existing policies to them or create new provisions specifically for UxS. The following section will outline the ways in which FVEY countries have integrated UxS into a policy framework that was written before the existence of such systems.

#### **IV. Classifications of UxS Among FVEY Nations**

Pending international clarification, states self-determine if UxS are included under existing policy<sup>25</sup> A study has been conducted by Comite Maritime International in which they

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<sup>24</sup> Liquid Robotics, Inc. (2022, July 27). *The Wave Glider | How It Works*. Liquid Robotics. <https://www.liquid-robotics.com/wave-glider/how-it-works/>

<sup>25</sup> McKenzie, S. (2020). When is a Ship a Ship? Use by State Armed Forces of Un-crewed Maritime Vehicles and the United Nations Convention on the Law of the Sea. *Melbourne Journal of International Law*, 21. <https://doi.org/10.31228/osf.io/a7xtc>

asked seventeen countries a series of questions about the status of unmanned ships.<sup>26</sup> While this study outlined the ways in which different countries interpreted their laws in regard to larger UxS, such as cargo ships, it did not show more broadly how countries are integrating various types of UxS into their policy framework through recent policies, regulations or other actions. This section will outline the provisions promulgated and actions taken by nations to make clear their views on UxS and how such systems fit into an environment of ships and vessels.

### **A. Existing Classifications**

The U.S. has explicitly stated in an official publication that UxS are considered ships and are granted the associated rights. In the 2022 Commander's Handbook on the Law of Naval Operations, UxS are said to have the ability to "operate independently as a ship" and to "exercise any internationally lawful use of the seas."<sup>27</sup> UxS are clearly defined as "ships," therefore, they fall under the regulatory regime of UNCLOS and other relevant laws. Additionally, the handbook states that UxS "engaged exclusively in government, noncommercial service are sovereign immune craft," solidifying the position that the rights afforded to conventional manned ships under UNCLOS also apply to UxS.<sup>28</sup> The U.S. has integrated UxS into an existing policy framework that was created with only crewed vessels in mind.

The U.K., while lacking an explicit regulation declaring UxS as vessels, has considered how the new technology fits into the existing UNCLOS framework. In an International Relations and Defence Committee meeting on UNCLOS and modern uses of the sea, the conclusion

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<sup>26</sup> Comite Maritime International. (2018). CMI International Working Group Position Paper on Unmanned Ships and the International Regulatory Framework. *Comite Maritime International*. <https://comitemaritime.org/wp-content/uploads/2018/05/Summary-of-Responses-to-the-CMI-Questionnaire.docx>

<sup>27</sup> U.S. Department of Navy, Office of the Chief of Naval Operations. *The Commander's Handbook on the Law of Naval Operations*. Sec 2.3.4. (2022). [https://usnwc.libguides.com/ld.php?content\\_id=66281931](https://usnwc.libguides.com/ld.php?content_id=66281931)

<sup>28</sup> *ibid.*

reached was that the provisions ought to be interpreted on a “principle of equivalence.” This means that as long as the new technology meets the given safety requirements for conventionally manned ships, they too, should be considered ships and given the associated rights. In 2021 alone, the U.K. registered 23 UxS as vessels.<sup>29</sup> In its Maritime 2050 Strategy, the Department for Transport aimed to be a leader in the “uptake of smart shipping technologies” and in being the “register authority for autonomous and semi-autonomous vehicles,” indicating that it views UxS as ships or vessels capable of registration as such.<sup>30</sup> The U.K. is setting a strong precedent by integrating UxS under their policy as vessels.

The Australian Maritime Safety Authority has consistently referred to UxS as “vessels” when referencing them, and has stated that “currently, these vessels are subject to the same regulatory framework as other vessels, including for survey standards and crewing requirements.”<sup>31</sup> They state explicitly that because of the broad definition of “vessel” in the Navigation Act of 2012 and the Marine Safety National Law Act of 2012, these regulations apply to UxS. Australian authorities have solidly stated that UxS fall under the same regulatory regime as conventional vessels and have set a precedent that they are to be treated as vessels.

Transport Canada has created a policy on the Oversight of small Maritime Autonomous Surface Ships (MASS).<sup>32</sup> Even in the title of the policy, they refer to the UxS as “ships,” indicating that they will treat them as such in following legal discourse. Additionally, in a 2002

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<sup>29</sup> International Relations and Defence Committee. (2021). *Corrected oral evidence: UNCLOS: Fit for purpose in the 21st century?* (HL 2021). [Online]. London. [Accessed 03 June 2023]. <https://committees.parliament.uk/oralevidence/3000/pdf/>

<sup>30</sup> U.K. Department for Transport. *Maritime 2050– Navigating the Future*. (2019). [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/872194/Maritime\\_2050\\_Report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/872194/Maritime_2050_Report.pdf)

<sup>31</sup> Australian Maritime Safety Authority. *Autonomous vessels in Australia*. (2022). <https://www.amsa.gov.au/vessels-operators/domestic-commercial-vessels/autonomous-vessels-australia>

<sup>32</sup> Transport Canada. *Tier I- Policy- Oversight of small Maritime Autonomous Surface Ships (MASS)*. (2022). <https://tc.canada.ca/en/marine-transportation/marine-safety-management-system-tp-13585-e-tier-i-policies/tier-i-policy-oversight-small-maritime-autonomous-surface-ships-mass>

court case regarding an unmanned submersible device, a Canadian federal court applied the definition of vessel very widely, where the physical presence of a crew on board is not necessary in order to be classified as a vessel.<sup>33</sup>

New Zealand issued an Interim Technical Note (ITN) in 2020 to provide guidance for using UxS. The policy refers to the UxS consistently as ships, and provides viable pathways for registration, indicating New Zealand's view that UxS are indeed considered to fall under their definition of "ship."<sup>34</sup> The document acknowledges that UxS do not meet certain crewing and watchkeeping requirements laid out in other policies and regulations, in which case ship owners are able to apply for exemptions that will allow their UxS to be registered. Interestingly, the ITN excludes "remotely operated vehicles (ROVs) such as those used in subsea operations, which during the mission are physically or wirelessly connected to the relevant support vessel from which they are controlled."<sup>35</sup> The exclusion of this kind of watercraft raises interesting questions and could offer some insight into what navigate means under New Zealand law. Perhaps these vessels are excluded because of the unreliability of their "ability to navigate." If there was any interference with their remote-control communications, this ability would be lost, as opposed to a pre-programmed UxS that does not need constant communication with a driver.

Every FVEY country has either explicitly labeled UxS as "ships" or "vessels," or indicated that they receive the same rights under UNCLOS. While it is unclear whether UxS fall under their legal definitions of "ship" and "vessel," these nations have made their interpretation of the law clear by stating so in policies or registering UxS as ships. FVEY nations are setting a

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<sup>33</sup> Comite Maritime International. (2018). Canada CMI Questionnaire on Unmanned Cargo Ships. *The Canadian Maritime Law Association*. (2018). <https://comitemaritime.org/wp-content/uploads/2018/05/CMI-IWG-Questionnaire-Unmanned-Ships-CANADA.pdf>

<sup>34</sup> Maritime New Zealand. *Autonomous Ship Operation in New Zealand*. (2020). <https://www.maritimenz.govt.nz/content/rules/interim-technical-notes/ITN-002-20.pdf>

<sup>35</sup> *ibid.*

precedent for UNCLOS to apply to UxS, giving them the same rights and responsibilities as conventional crewed vessels. These include innocent passage, due regard, and other rights, which have become increasingly relevant with UxS seizures like the 2016 USS Bowditch incident.<sup>36</sup> Without a legal regime establishing the way UxS must act and be treated, we run the risk of creating an unsafe maritime environment for commercial operation and elevating the potential for military escalation. FVEY countries have effectively established that having humans on a watercraft is not a prerequisite to it being a vessel or ship. While it is encouraging that all FVEY countries are considering UxS and setting a precedent for international law, many questions about their integration into the maritime environment remain.

The following section includes a summary table that offers a quick reference for these findings while the final section lays out future research questions to advance clarity in legal treatment of UxS.

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<sup>36</sup> The National Bureau of Asian Research. (2021). *The Implications of China's Seizure of a U.S. Navy Drone - The National Bureau of Asian Research (NBR)*. The National Bureau of Asian Research (NBR). <https://www.nbr.org/publication/the-implications-of-chinas-seizure-of-a-u-s-navy-drone/>

V. Summary Table

	Define vessel?	Define ship?	Circular “vessel” definition? <sup>37</sup>	Condition for being a “vessel” besides being in the water	Classify UxS as vessels or ships?
<b>United States</b>	Y	Y	N	Capable of transportation	Yes, in <a href="#">2022 Commander’s Handbook on the Law of Naval Operations</a> , ship registration
<b>United Kingdom</b>	Y	Y	Y	Used for navigation	Yes, in <a href="#">International and Defence Committee meeting</a> , ship registration
<b>Australia</b>	Y	Y	Y	Used for navigation	Yes, in a <a href="#">formal statement by the Australian Maritime Safety Authority</a>
<b>Canada</b>	Y	Y	N	Capable of navigation	Yes, in <a href="#">Oversight of small Maritime Autonomous Surface Ships (MASS) Policy</a> , legal precedent
<b>New Zealand</b>	N	Y	Y	Used for navigation	Yes, in a <a href="#">2020 Interim Technical Note</a>

<sup>37</sup> This refers to whether or not the term “vessel” is used in its own definition.

## **VI. Remaining Questions**

### **A. How will novel technology be integrated into existing policy? How will new policy be formulated to allow room for technological development?**

While this research made clear that UxS can be considered vessels and/or ships despite definitional challenges in existing policy, questions remain about the extent to which this classification will apply. Certain UxS have a clear crewed counterpart, such as an unmanned cargo ship or frigate. Other UxS, however, will be novel technology in their appearance, use, and capabilities. It will be significantly more difficult to integrate UxS into existing policy when they do not have a crewed counterpart to which they can be compared. What this analysis has shown is that in FVEY countries, being labeled as a vessel does not necessitate manning. What it has not shown is that all UxS, present and future, will be considered UxS by these nations. The extreme variability in these systems, much of it still unknown, will continue to pose legal and policy challenges.

### **B. What does it mean to “navigate” or to “transport?”**

The Wave Glider can navigate without a means of mechanical propulsion and simply harnesses the wave energy surrounding it to move in its intended direction.<sup>38</sup> Technology is fundamentally changing the ways in which navigation happens and what it means to do so. Additionally, there is the question of whether the small sensors that the Wave Glider carries constitute “transportation.” Seemingly simple terms leave ambiguity in how intentional navigation needs to be (to what extent is a device drifting with the waves “navigating”), by what means the navigation needs to occur (are there requirements for propulsion), and what degree of

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<sup>38</sup> Liquid Robotics, Inc. (2022, July 27). *The Wave Glider / How It Works*. Liquid Robotics. <https://www.liquid-robotics.com/wave-glider/how-it-works/>

autonomy the navigation needs to occur at (does a remote control equate to an artificially intelligent craft). While a precedent has been set that UxS do indeed fall under the requirements of “navigating” and “transporting” enough to be considered vessels, New Zealand’s decision to exclude UxS that are remote controlled shows that there will be much more nuance involved as new technology emerges. Clear definitions of these terms will be necessary, as well as further classifications of UxS by degree of autonomy, networking capability, use, and a variety of other characteristics.

### **C. How do non FVEY countries, especially our adversaries, define UxS?**

The ambiguity surrounding UxS can be taken advantage of by other nations to commit legally questionable actions. Without the protections given to crewed vessels and ships in UNCLOS, UxS are subject to unfair treatment by other hostile nations. The U.S. has already had two countries seize its UxS (China and Iran), with both countries claiming their actions were legal and justified. In future research, it would be interesting to uncover more about how these nations define UxS. If they do not consider UxS ships or vessels under their laws, UNCLOS would not apply. If they do, they were simply acting provocatively by seizing the UxS and taking actions they knew were legally ambiguous. While this report has shown that FVEY countries are setting a precedent of treating UxS as vessels legally, other nations may not be doing the same.