

Arctic Governance over Autonomous Systems in the Arctic



ScanEagle Unmanned Aircraft System Prototype in-flight
Photo Credit: Insitu



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Rebecca Grippo

rgrippo584@g.rwu.edu

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Introduction

In the Arctic region, unmanned and autonomous systems (UxS) are proving to be useful in the harsh environment and unpredictable climate.¹ However, the conventions and bilateral agreements that make up the governance of this region were not written for UxS. In fact, UxS do not appear in the governance documents of the region, despite their prevalent use there. This is not unusual; UxS are used around the globe but systems and technology are ahead of the law and policy governing them.

This report seeks to answer the following research question: how do existing policies or laws under Arctic governance apply to UxS in the maritime environment and the airspace? The main areas of governance in the region are the Polar Code and the United Nations Convention on the Law of the Sea (UNCLOS). Although these policies do not explicitly discuss UxS, these regulatory schemes can act as guidance for new policies or amending provisions to create room for UxS.

This report analyzes the Polar Code and UNCLOS as authorities over underwater systems, specifically looking at Article 234 of UNCLOS for vessels in ice-covered areas. For systems in the air, the report addresses authority of the Federal Aviation Administration (FAA), International Civil Aviation Organization (ICAO), and under the Specific Operations Risk Assessment (SORA Documents). The Arctic Council, a non-rulemaking and non-regulatory forum aimed at cooperation and coordination among the Arctic States, is also relevant in the analysis of Arctic governance. To show how these authorities apply, this report presents two scenarios - one in the air with an UxS called Scout and one underwater with an UxS called Luke.² The scenarios show how the authorities apply in specific situations and how application changes throughout their journeys, especially in contested areas in the region. Their journey will follow the same route – one in air and one underwater - starting on the west coast of Alaska, going around the Seward Peninsula, through the Bering Strait, through a portion of the Northwest Passage, concluding on the Northeast side of Alaska.

¹ Unmanned and autonomous systems are also known as uncrewed systems. This report uses UxS for unmanned and autonomous systems generally; it uses UAS for Unmanned Aircraft Systems and UAVs for Unmanned Aerial Vehicles interchangeably.

² The underwater scenario builds on analysis presented in a 2021 report. See Fletcher, K., Lesse, M., DeCocco, P., Hahn, E., (2021). *Priority Law and Policy Issues Related to Autonomous and Unmanned Systems*. https://nps.edu/documents/114698888/121733922/CRUSER_Priority+Law+%26+Policy+Issues+%28Dec+2021%29.pdf/e3b6a430-a00d-faf9-cfd3-fabea603ee1a?t=1643158769410

Scenario One: Scout in the Air

Scout is an Unmanned Aircraft System (UAS) prototype of the ScanEagle (See Figure 1), which is a long-endurance autonomous and unmanned aircraft system that provides day, night intelligence, surveillance, and reconnaissance (ISR) for governmental and civil purposes. In this scenario, Scout is launched at or below 20,000 feet from the platform of the proposed Hybrid Airship (See Figure 2). The Hybrid Airship, also known as the Airlander 10, was built for the U.S. Army for logistics operations in Afghanistan and to further its mission of zero-carbon aviation without compromising capability. This system is capable of remaining airborne for five days, carrying 10 tons, traveling 4,000 nautical miles, and flying at 20,000 ft. The goal in this scenario is to deploy UAS, via the Hybrid Airship's platforms, to create a consistent presence in the Arctic as global interest in the area and these systems increase. Scout has the following dimensions: Height: ~1.2 ft, Width: 10.2 ft, Depth: 5.6 ft, Weight: 39.68 lbs. (empty), 48.5 lbs. (maximum takeoff). Its speed will be 50-60 knots cruising and 80 knots at its maximum. As a ScanEagle, Scout will be controlled by an operator in a Ground Control Station (GCS). It is foreseeable that, by 2050, it could be an autonomous system rather than controlled remotely.

Figure 1: ScanEagle UAS Prototype³

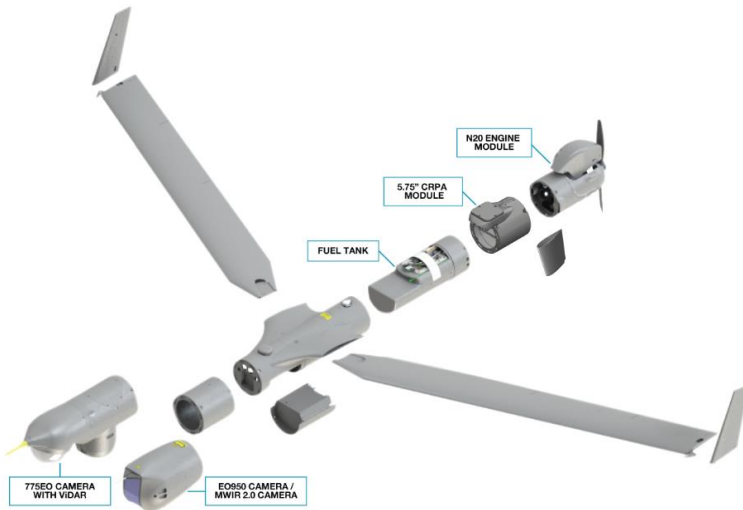
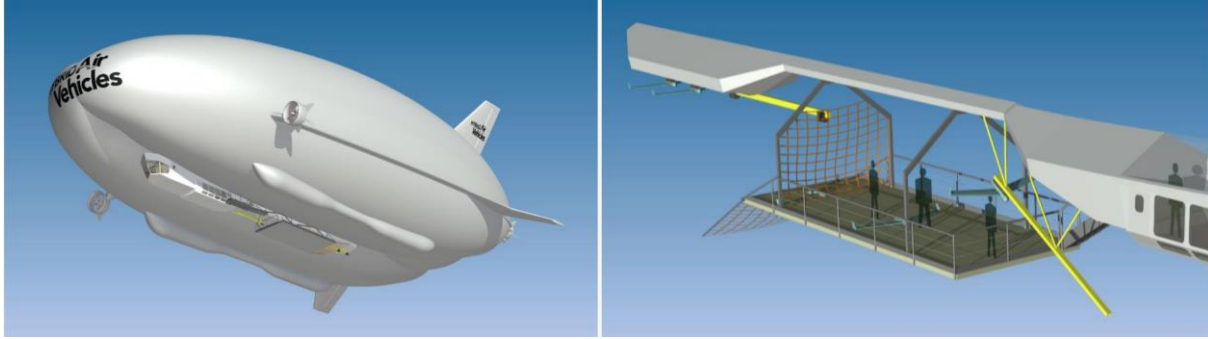


Figure 2: Hybrid Airship Plan, View of Platform

³ For more details on the ScanEagle, see Insitu. (2022, August 5). *ScanEagle*. <https://www.insitu.com/products/scaneagle>



Scout will be taking a route from Alaska, around the Seward Peninsula, through the Bering Strait, and through part of the Northwest Passage to conclude its route on the Northeast side of Alaska (See Figure 3).

Figure 3: Scout's Journey



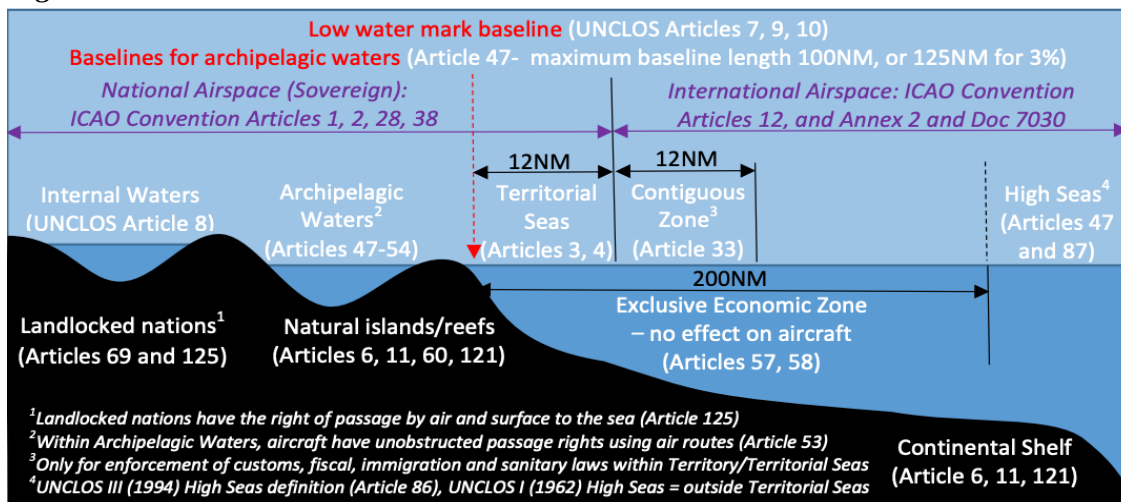
This journey will include internal waters, territorial seas, and Exclusive Economic Zone (EEZs) as defined by UNCLOS (See Figure 4). Internal waters are defined as waters on the landward side of the baseline;⁴ Arctic and non-Arctic States have the right of innocent passage here.⁵ Like internal waters, States have the right of innocent passage in the territorial sea with some exceptions for protection of the coastal state. The territorial sea is generally twelve miles out from the baseline, and every state has the right to establish the breadth of this, while not

⁴ The normal baseline is an Arctic State's coastline, or where its low-water line is marked on charts officially recognized by the Arctic State. UN General Assembly, Convention on the Law of the Sea, December 10 1982, Article 5 [hereinafter UNCLOS]. https://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf

⁵ UNCLOS at Article 8.

exceeding the 12-mile marker.⁶ The coastal state has sovereignty over the seabed as well as the airspace in this area.⁷ EEZs are generally 200 miles out from the baseline; here, coastal states claim the economic value of the resources in this area, such as oil and gas or undersea minerals and fisheries.⁸ In the EEZ, all states enjoy the freedom of overflight and navigation.⁹ There is also the Contiguous Zone, which is no more than 24 miles out from the baseline; certain laws and regulations of the coastal state apply here.¹⁰ Scout will not be entering the high seas, which are known as international waters and are outside the boundaries of states' EEZs.¹¹ Generally, states have the right to freely navigate and exploit the resources in the high seas¹² but there are certain protections in place in the Arctic Ocean such as the International Agreement to Prevent Unregulated Fishing in the High Seas of the Central Arctic Ocean which went into effect in 2021 and will be in effect for 16 years.¹³ The legal standards that apply to the airspace are based on these maritime zones, which Scout will fly over.

Figure 4: Governance in the Air and over the Territorial Areas



Governance over Scout

Throughout Scout's journey, through the U.S. EEZ off Alaska, the Bering Strait, and the Northwest Passage, Scout will stay mostly in U.S. airspace. The U.S. has sovereignty over its

⁶ UNCLOS at Article 3.

⁷ UNCLOS at Article 2.

⁸ UNCLOS at Article 57- 56.

⁹ UNCLOS at Article 58.

¹⁰ UNCLOS at Article 33.

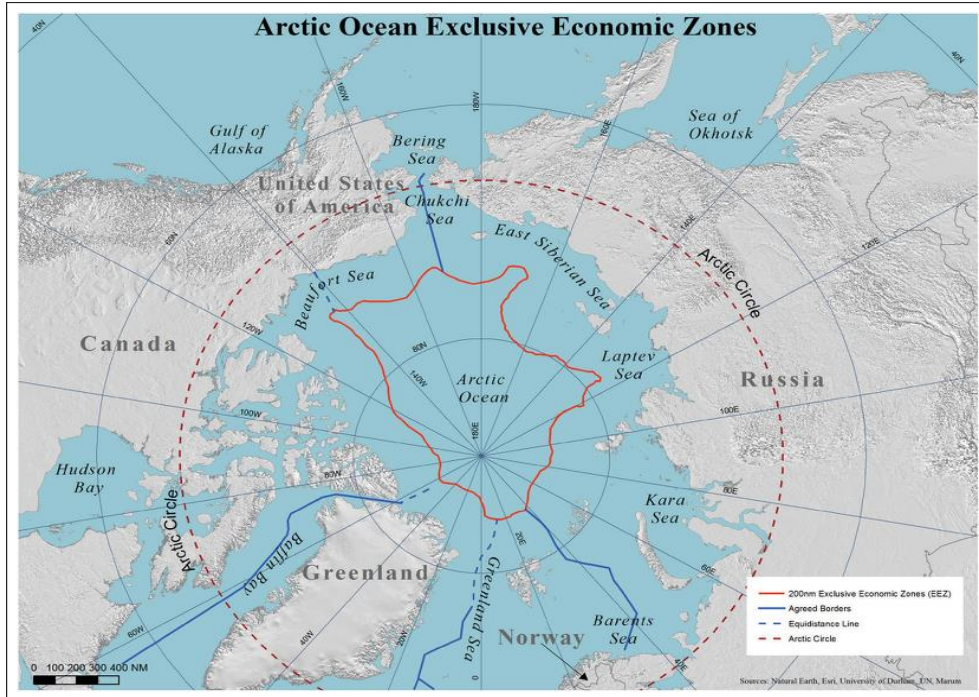
¹¹ UNCLOS at Article 87.

¹² *Id.*

¹³ International Agreement to Prevent Unregulated Fishing in the High Seas of the Central Arctic Ocean, October 3, 2018. <https://www.mofa.go.jp/files/000449233.pdf> The agreement was signed by Canada, European Union, United States, China, Japan, Russia, Iceland, Norway, South Korea and Denmark.

EEZ.¹⁴ However, other States¹⁵ generally have freedom of overflight and navigation in EEZs.¹⁶ (See Figure 5 for EEZ borders).

Figure 5: Exclusive Economic Zones¹⁷



In U.S. Airspace

Because Scout is an airborne UxS, while it is in U.S. national airspace, it will be governed by the Federal Aviation Administration (FAA). FAA authority extends to the outer edge of the U.S. territorial sea. The relevant FAA regulation is known as the Small UAS Rule or the Part 107 Rule. This applies to Scout because the rule applies to systems 55 pounds and less and Scout weighs 39.68 - 48.5 lbs.¹⁸ Under the Part 107 Rule, the drone must be registered with the FAA at the FAA Drone Zone to fly in the national airspace.¹⁹ Further, the remote pilot must

¹⁴ UNCLOS at Article 58.

¹⁵ In this context, UNCLOS uses the term, “States,” as parties bound to or who have ratified the Convention and its provisions. UNCLOS at Article 1 subpart 2(1).

¹⁶ UNCLOS at Article 58.

¹⁷ Jones, P., McGrath-Horn, M., Merighi, M. Murray, S., Riley, C., Rotar, B., Singh, K., et al. (2017). *The Arctic and the LOSC*. In J. Burgess, L. Foulkes, P. Jones, M. Merighi, S. Murray, J. Whiteacre (Eds.), *Law of the Sea* (pp. 59-66). Trustees of Tufts College. <https://sites.tufts.edu/lawofthesea/chapter-eight/>

¹⁸ Small Unmanned Aircraft Systems, 10 C.F.R §107.110(a)(1) (2022). <https://www.ecfr.gov/current/title-14/chapter-I/subchapter-F/part-107>

¹⁹ UAV Coach. (2022, August 5). *Drone Laws in the United States of America*. <https://uavcoach.com/drone-laws-in-united-states-of-america/#:~:text=You%20must%20register%20your%20UAV,a%20drone%20under%2055%20lbs> [hereinafter UAV Coach]

be certified²⁰ and must fly the UAS within the visual line-of-sight.²¹ The FAA's Small UAS rule specifies the need for a remote pilot because currently, there is no unclassified mechanism approved for a fully autonomous system in the airspace, so a remote pilot or automated decision-making is required. That is why the ScanEagle is controlled by an operator in a Ground Control Station. Operators are encouraging movement toward a fully autonomous system by 2050. The FAA rule will have to be amended to allow for the operation of an autonomous system without a remote pilot.

After registering, the UAS must be properly labeled.²² In terms of anti-collision lighting requirements, the Convention on the International Regulations for Preventing Collisions at Sea (COLREGs) can apply to UAVs flying above the water, as they are defined as vessels.²³ COLREGs is a convention under the International Maritime Organization that governs traffic collision schemes and control.²⁴ Researchers found that UAVs flying at low altitudes above water should be characterized as a vessel by COLREGs, and thus UAVs should comply, generally, with the provisions of COLREGs.²⁵

Thus far, as a ScanEagle, Scout has received restricted category type certification and clearance by the FAA in 2013, making it the first ever beyond-line-of-site operation. This is a step forward in integrating UAS into national airspace regulations.

In the Bering Strait Region

When Scout passes over the Bering Strait, it will stay over the U.S. territorial seas and EEZ. The Bering Strait lies within the territorial seas of the Russian Federation and the U.S., and its remaining waters lie within their EEZs. (See Figure 6). The Bering Strait Region is known as contested waters or a contested area, which is an area of overlapping jurisdiction or one where sovereignty is questioned. Here, both the U.S. and the Russian Federation stake a claim to the region by way of UNCLOS Articles 121 and 3 because of an extension of internal waters. Article 121 gives the coastal state the right to extend its territorial sea from each side of an island in the sea, and Article 3 defines this as up to 12 nautical miles from the baseline. Because of the rock

²⁰ Small Unmanned Aircraft Systems, 10 C.F.R. §107.7(a) (2022). <https://www.ecfr.gov/current/title-14/chapter-I/subchapter-F/part-107>

²¹ UAV Coach.

²² Small Unmanned Aircraft Systems (UAS) Regulations. 14 C.F.R. 107 (2020). <https://www.faa.gov/newsroom/small-unmanned-aircraft-systems-uas-regulations-part-107#:~:text=To%20operate%20the%20controls%20of,in%20one%20of%20two%20ways>

²³ Chuah, J. C. T. & Movaghar, A. (2021). Shore to Ship Drones – Relevance and Applicability of Maritime Navigation Rules. *Journal of Maritime Law and Commerce*. [https://openaccess.city.ac.uk/id/eprint/27753/3/Shore%20to%20Ship%20Drones%20&%20COLREGs%20\(Revised\).pdf](https://openaccess.city.ac.uk/id/eprint/27753/3/Shore%20to%20Ship%20Drones%20&%20COLREGs%20(Revised).pdf)

²⁴ Convention on the International Regulations for Preventing Collisions at Sea, October 20, 1972. [http://www.mar.ist.utl.pt/mventura/Projecto-Navios-I/IMO-Conventions%20\(copies\)/COLREG-1972.pdf](http://www.mar.ist.utl.pt/mventura/Projecto-Navios-I/IMO-Conventions%20(copies)/COLREG-1972.pdf) [hereinafter COLREGS]

²⁵ Chuah, J. C. T. & Movaghar, A. (2021). Shore to Ship Drones – Relevance and Applicability of Maritime Navigation Rules. *Journal of Maritime Law and Commerce*. [https://openaccess.city.ac.uk/id/eprint/27753/3/Shore%20to%20Ship%20Drones%20&%20COLREGs%20\(Revised\).pdf](https://openaccess.city.ac.uk/id/eprint/27753/3/Shore%20to%20Ship%20Drones%20&%20COLREGs%20(Revised).pdf)

formations and islands in the area, the U.S. has established its baseline (for purposes of determining the 12-mile territorial sea) from Little Diomed Island, Fairway Rock, and the Seward Peninsula, and the Russian Federation claims its baseline from the Chukotka Peninsula and Big Diomed Island. This creates four channels, “covered by the term Bering Strait: between the Russian mainland and Big Diomed Island; between Big Diomed Island and Little Diomed Island; between Little Diomed Island and Fairway Rock; and between Fairway Rock and the U.S. mainland.”²⁶ These channels are within the national jurisdiction of these two neighboring coastal States, while the U.S. and the Russian Federation are required to respect the right of transit/innocent passage of all ships and aircraft through this area because it is classified as a strait under UNCLOS part III.²⁷

The lack of high sea areas in this region can be limiting on navigation as states have sovereign rights over their territorial seas. This is the rationale for establishing the region as an international strait, to allow for navigation even without the flexibility of the high seas. The legal precedent for defining such a strait is the Corfu Channel case, which gives the “the decisive criterion [as] connecting two parts of the high seas and used for international navigation.”²⁸ The importance of international navigation is confirmed by UNCLOS Articles 37 and 38, the right of transit or innocent passage shall not be impeded. Applying this rule in the Corfu Channel case, the Bering Strait connects the Bering Sea and the Chukchi Sea, as well as being the only connection between the Arctic and Pacific Oceans. It is also used for international navigation, although it is only used by eight ships per day for six months out of the year because of the navigability and climate of the region.²⁹ However, because it connects two parts of the high seas and is used for international navigation, it is classified as an international strait.

While there are many bilateral agreements between the U.S. and Russian Federation regarding the Bering Strait region, the region is resource-rich and a shared gateway between the Pacific and Arctic Oceans which will be used increasingly in the future with melting ice from climate change. With tense relations following Russia’s invasion of Ukraine in 2022, future negotiations may be necessary but difficult. Given the context, Scout will stay on the U.S. side of the region where the U.S. has sovereignty over the airspace with no limitations that the system would have if it entered the Russian territorial sea, where it could be open to confiscation by the Russian Federation.

²⁶ Berkman, P. A., Vylegzhanin, A. N., Young, O. R. (2016). Governing the Bering Strait Region: Current Status, Emerging Issues and Future Options. *Ocean Development & International Law*, 47(2), 186-217.

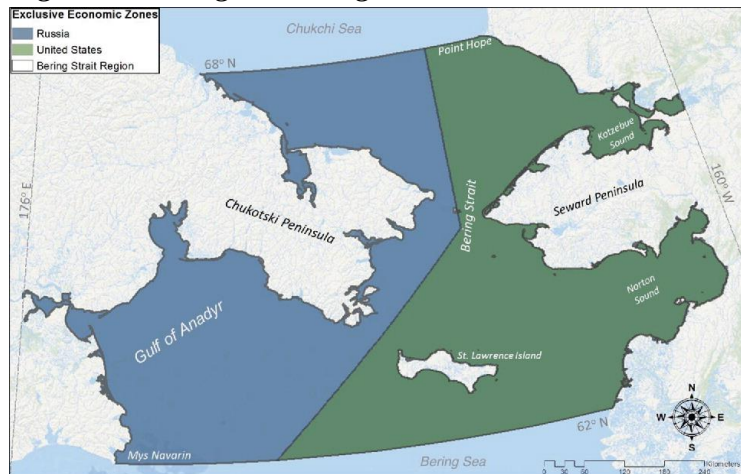
<https://doi.org/10.1080/00908320.2016.1159091>

²⁷ *Id.*

²⁸ Jones, P., McGrath-Horn, M., Merighi, M. Murray, S., Riley, C., Rotar, B., Singh, K., et al. (2017). The Arctic and the LOSC. In J. Burgess, L. Foulkes, P. Jones, M. Merighi, S. Murray, J. Whiteacre (Eds.), *Law of the Sea* (pp. 59-66). Trustees of Tufts College. <https://sites.tufts.edu/lawofthesea/chapter-eight/>

²⁹ Although the Bering Strait is currently unusable for six months out of the year, it can accommodate large shipping containers and vessels that other contested areas, such as the Northern Sea Route, cannot handle. More information here: <https://doi.org/10.1080/00908320.2016.1159091>

Figure 6: Bering Strait Region³⁰



In the Northwest Passage

Similarly, the Northwest Passage is also a contested area; the Northwest Passage is claimed by Canada as its internal waters under a claim of historic usage by the Inuit People.³¹ (See Figure 7). The U.S. does not recognize this assertion as legal and further argues that the need and preference for international navigation trumps this assertion.³² UNCLOS Article 38 states that “all ships and aircraft enjoy the right of transit passage, which shall not be impeded,” where transit passage is the exercise “of the freedom of navigation and overflight solely for continuous and expeditious transit of the strait.”³³ Some legal analysts agree that the Northwest Passage’s legal status is correctly classified as an international strait and should be free to use for international navigation.³⁴

Although Canada asserts that it has the right to exclude ships from its internal waters if States fail to comply with local regulations, the U.S. argues that because of the freedom of the high seas, innocent or transit passage may not be obstructed by excluding vessels under Article 234.³⁵ Canada’s assertion is also incongruent with UNCLOS Article 37; if the Northwest Passage is considered a strait under Article 37, then any vessel would have the right of transit passage without any interference from Canada’s regulations.³⁶

This disagreement on the application of UNCLOS is integral to how Scout will be treated in the region. If Scout stays in U.S. waters (within the portion of the Northwest Passage that is a

³⁰ *Id.*

³¹ Jones, P., McGrath-Horn, M., Merighi, M. Murray, S., Riley, C., Rotar, B., Singh, K., et al. (2017). The Arctic and the LOSC. In J. Burgess, L. Foulkes, P. Jones, M. Merighi, S. Murray, J. Whiteacre (Eds.), *Law of the Sea* (pp. 59-66). Trustees of Tufts College. <https://sites.tufts.edu/lawofthesea/chapter-eight/>

³² *Id.*

³³ *Id.*

³⁴ Note. (2020). The Potential-Use Test and the Northwest Passage. *Harvard Law Review* 133, 2579. <https://harvardlawreview.org/2020/06/the-potential-use-test-and-the-northwest-passage/>

³⁵ *Id.*

³⁶ Note. (2020). The Potential-Use Test and the Northwest Passage. *Harvard Law Review* 133, 2579. <https://harvardlawreview.org/2020/06/the-potential-use-test-and-the-northwest-passage/>

part of the U.S. EEZ off Alaska), Scout will have full freedom to navigate, survey, and collect research. However, if it goes into Canadian waters (the part of the Northwest Passage claimed by Canada), it will have to abide by Canada's policies.³⁷

Figure 7: Northwest Passage³⁸



Note on International Airspace Governance

If Scout goes outside of national airspace, beyond the U.S. territorial sea, the FAA no longer has authority, and the U.S. follows provisions from the International Civil Aviation Organization (ICAO) as a council member state. The ICAO was formed under the Convention on International Civil Aviation (also known as the Chicago Convention). The ICAO's UAS regulations include policies regarding remote piloting and unmanned free balloons. Relevant regulations are in Part 101, Part 102, and Part 149 of the convention, as well as their Companion Advisory Circulars.³⁹

The ICAO also requires State aircraft have due regard for the safety of navigation of civil aircraft, under Article 3 of the Chicago Convention.⁴⁰ The FAA defines due regard as “a phase of flight wherein an aircraft commander of State-operated aircraft assumes responsibility to

³⁷ For information on the Canadian Coast Guard's latest UAS trials, see: Smith, O. (2022, February 14). *V-BAT drone Canadian Coast Guard trials show “comprehensive airspace picture”*. Unmanned Airspace. <https://www.unmannedairspace.info/latest-news-and-information/v-bat-drone-canadian-coast-guard-trials-show-comprehensive-airspace-picture/>

³⁸ Jones, P., McGrath-Horn, M., Merighi, M. Murray, S., Riley, C., Rotar, B., Singh, K., et al. (2017). The Arctic and the LOSC. In J. Burgess, L. Foulkes, P. Jones, M. Merighi, S. Murray, J. Whiteacre (Eds.), *Law of the Sea* (pp. 59-66). Trustees of Tufts College. <https://sites.tufts.edu/lawofthesea/chapter-eight/>

³⁹ International Civil Aviation Organization. (n.d.). *Introduction to ICAO Model UAS Regulations and Advisory Circulars*. Retrieved 2022, from <https://www.icao.int/safety/UA/Pages/ICAO-Model-UAS-Regulations.aspx>

⁴⁰ ICAO European and North Atlantic Office. (2015). *Operation of State Aircraft*. <https://www.icao.int/EURNAT/Other%20Meetings%20Seminars%20and%20Workshops/ICAO%20Civil-Military%20Cooperation%20Meetings/ICAO%20Civil-military%20Cooperation%20Symposium%202015/ICMCS%20IP01.pdf>

separate his/her aircraft from all other aircraft,” under Federal Aviation Administration Order (FAAO) 7110.65.⁴¹

The Specific Operations Risk Assessment, or SORA Documents, are also used as guidance in international airspace because they provide more specificity. The SORA provides recommendations on how to safely assess and conduct UAS operations, including UAS military operations.⁴² They are endorsed by the European Aviation Safety Agency (EASA) to fulfill the requirements of the EU Regulations, and they were created by a working group under JARUS; Joint Authorities for Rulemaking on Unmanned Systems is a group of experts from different countries' national aviation authorities.⁴³ SORA does not replace civil regulations; rather, they help identify safety risks with the operation of UAS by laying out a clear assessment of risks associated with UAS operation.

Scenario Two: Luke Underwater

As noted above, the underwater scenario through the Arctic region builds on a scenario in a 2021 report with an underwater glider called Luke.⁴⁴ Luke is an underwater vessel, much like the Slocum G3 Glider.⁴⁵ The glider's length is 1.5 meters, and its hull diameter is 22 cm with a mass of 55 - 70 kgs. It operates as a buoyancy glider without a mothership, and its depth ranges from 4 to 150m or 40 to 1000m as its operating depth range.⁴⁶ While there is some debate about whether UxS are vessels under international maritime laws, for purposes of this report, we assume this UxS meets the definition of vessel.

Here, Luke will be taking the same route underwater as Scout did in the air, from Alaska, around the Seward Peninsula, through the Bering Strait and Northwest Passage to conclude its journey on the other side of Alaska.

Governance over Luke

While Luke begins its journey, much like Scout, coming from Alaska, it will pass through the internal waters, territorial sea, and the EEZ of the United States as noted in the above section.

In United States Waters

⁴¹ *Id.* For maritime purposes, vessels must also maintain due regard “to the rights and duties of the coastal State and shall comply with the laws and regulations adopted by the coastal State” as defined under UNCLOS Article 58.

⁴² European Cockpit Association. (2019). *Specific Operations Risk Assessment (SORA)*. ECA.

<https://www.eurocockpit.be/positions-publications/specific-operations-risk-assessment-sora>

⁴³ *Id.*; Joint Authorities for Rulemaking on Unmanned Systems. (n.d.). *JARUS*. Retrieved 2022, from <http://www.jarus-rpas.org/>

⁴⁴ Fletcher, K., Lesse, M., DeCocco, P., Hahn, E., (2021). *Priority Law and Policy Issues Related to Autonomous and Unmanned Systems*.

https://nps.edu/documents/114698888/121733922/CRUSER_Priority+Law+%26+Policy+Issues+%28Dec+2021%29.pdf/e3b6a430-a00d-faf9-cfd3-fabea603ee1a?t=1643158769410

⁴⁵ *Id.*

⁴⁶ For more information, see: Teledyne Marine. (2022, August 5). *Slocum G3 Glider*.

<http://www.teledynemarine.com/slocum-glider>

In these areas, UNCLOS is the overarching law that governs the use and claims over ocean areas and governs Luke as a vessel. The U.S. is a signatory to the treaty, but has not yet ratified it; however, the U.S. accepts most provisions as customary international law. According to UNCLOS Articles 8, 3, 4, and 57, the U.S. has sovereignty over these areas, so government-operated systems from the U.S., like Luke, are free to navigate, collect research, and survey these areas. In the U.S. territorial sea, the U.S. has an absolute right to the waters and its subsoil, except it must allow the innocent passage of other ships and vessels. Because the United States has sovereignty over its EEZs, Luke will have access to all the resources here as well as the freedom to navigate, survey, and collect research.

There is a provision in UNCLOS that is specific to the Arctic, Article 234, which allows the Arctic Coastal States to create laws to prevent, reduce, and control marine pollution from vessels in ice-covered areas.⁴⁷ As the Article states, the rough climate and ice covering the areas create obstructions and hazards to navigation, which disrupts the balance of the marine environment.⁴⁸ Thus, the laws and regulations should have due regard for these hazards and possible pollutants, as well as protect and preserve the marine environment.⁴⁹

UNCLOS Article 76 is also important to the Arctic as it lays out the limitations to the continental shelf and claims for extensions. Arctic Coastal States' EEZs generally extend 200 nautical miles out from the baseline or to the outer edge of the natural prolongation of the Coastal State's land territory, but this may not exceed more than 350 miles.⁵⁰ After a country ratifies UNCLOS, it has ten years to submit a claim asking to extend its continental shelf beyond the normally 200-mile mark.⁵¹ The Commission on Limits of the Continental Shelf (CLCS) facilitates the establishment of these outer limits regarding the continental shelf.⁵² States abide by the recommendations of the CLCS and by the "orderly settlement of any possible overlapping claims."⁵³

The United States Coast Guard has authority to enforce laws in the territorial sea and contiguous zone, including hazards to navigation. The Coast Guard operates under the Department of Homeland Security and safeguards "more than 95,000 miles of U.S. maritime border shoreline and 15,000 miles of waterways, seaports, and other commercially navigable

⁴⁷ UNCLOS at Article 234.

⁴⁸ *Id.*

⁴⁹ *Id.*

⁵⁰ UNCLOS at Article 76.

⁵¹ BBC. (2014, December 15). *Denmark challenges Russia and Canada over North Pole.*

<https://www.bbc.com/news/world-europe-30481309>

⁵² Commission on the Limits of the Continental Shelf (CLCS), 1997.

[https://www.un.org/depts/los/clcs_new/commission_purpose.htm#:~:text=The%20purpose%20of%20the%20Commission,nautical%20miles%20\(M\)%20from%20the](https://www.un.org/depts/los/clcs_new/commission_purpose.htm#:~:text=The%20purpose%20of%20the%20Commission,nautical%20miles%20(M)%20from%20the)

⁵³ Jones, P., McGrath-Horn, M., Merighi, M. Murray, S., Riley, C., Rotar, B., Singh, K., et al. (2017). The Arctic and the LOSC. In J. Burgess, L. Foulkes, P. Jones, M. Merighi, S. Murray, J. Whiteacre (Eds.), *Law of the Sea* (pp. 59-66). Trustees of Tufts College. <https://sites.tufts.edu/lawofthesea/chapter-eight/> Another contested area that is not analyzed in this report is Denmark's claim to the Lomonosov Ridge as an extension of Greenland's continental shelf. For more information, see: BBC. (2020, July 23). *The rush to claim an undersea mountain range.*

<https://www.bbc.com/future/article/20200722-the-rush-to-claim-an-undersea-mountain-range>

waters.”⁵⁴ With such a large area to patrol, UxS can play an important role. As of 2021, the Science and Technology Directorate (S&T) received multi-million dollar funding from Congress and initiated a research project involving the Coast Guard and six wind and solar-powered unmanned surface and underwater vessels.⁵⁵ The Coast Guard currently has a UAS Division that uses long-range, medium-range, and short-range UAS to survey, patrol, and monitor, but the Coast Guard hopes to expand into unmanned maritime systems (UMS).⁵⁶

In the Bering Strait

Like Scout, Luke will stay on the U.S. side of the Bering Strait to stay within the U.S. territorial sea. Luke will operate in the Bering Strait like the National Oceanic and Atmospheric Administration’s (NOAA) unmanned sailing drone that crossed the Bering Strait in 2017; it, too, remained on the U.S. side of the strait.⁵⁷

Similar to the governance over U.S. waters, UNCLOS Article 234 applies here because the Bering Strait is covered by ice for six months out of the year. Both the United States and the Russian Federation could argue that the “particularly severe climatic conditions and the presence of ice covering such areas for most of the year create obstructions or exceptional hazards to navigation.”⁵⁸ This means that either state could adopt non-discriminatory laws over the ice-covered areas within their EEZs aimed at preventing marine pollution and these exceptional obstructions or hazards that could each cause irreversible harm to the marine environment.⁵⁹

The Bering Strait Region is also within the scope of the Polar Code, which provides pollution prevention measures that do not mention the use of UxS. The Polar Code is a collection of conventions under the International Maritime Organization (IMO), which is a specialized agency of the United Nations, of which the U.S. is a member state.⁶⁰ The goal of the Polar Code is to protect the polar environment and ensure the safety and security of shipping.⁶¹ (See Figure 8). The Polar Code is not legally binding to government entities and does not explicitly include

⁵⁴ U.S. Department of Homeland Security. (2021, October 26). *How Autonomous Vessels Can Help the Coast Guard Safeguard Our Waters*. <https://www.dhs.gov/science-and-technology/news/2021/10/26/feature-article-how-autonomous-vessels-can-help-coast-guard-safeguard-our-waters>.

⁵⁵ *Id.*

⁵⁶ *Id.* For more information on the USCG’s UAS Programs and Strategy from 2020, see: U.S. Coast Guard Office of Aviation Forces. (2020, October). *Coast Guard UAS; Programs and Strategy*. unols.org/sites/default/files/2012scr_ap02.pdf

⁵⁷ National Oceanic and Atmospheric Administration. (2017, August 7). *Sailing drone captures dawn while crossing the Bering Strait*. <https://www.noaa.gov/news/sailing-drone-captures-dawn-while-crossing-bering-strait>

⁵⁸ Berkman, P. A., Vylegzhanin, A. N., Young, O. R. (2016). Governing the Bering Strait Region: Current Status, Emerging Issues and Future Options. *Ocean Development & International Law*, 47(2), 186-217. <https://doi.org/10.1080/00908320.2016.1159091>

⁵⁹ *Id.*

⁶⁰ The three conventions under the Polar Code are International Convention for the Prevention of Pollution from Ships (MARPOL), International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), and International Convention for the Safety of Life at Sea (SOLAS). International Maritime Organization. (2013). *IMO- What it is* [Fact sheet].

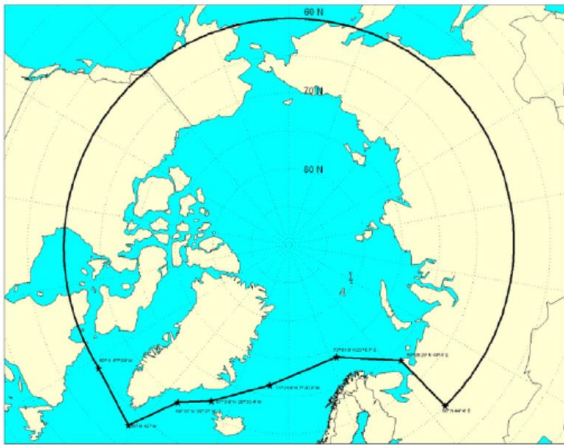
https://wwwcdn.imo.org/localresources/en/About/Documents/What%20it%20is%20Oct%202013_Web.pdf

⁶¹ International Maritime Organization. (n.d.). *Introduction to IMO*. Retrieved 2022, from <https://www.imo.org/en/About/Pages/Default.aspx>

UxS but can act as guidance for future governance. With ice melting as a result of climate change, commercial and governmental use of the region will increase; this increases the need for new regulations and amendments to the Code to stay current.

A provision in the Polar Code that may offer guidance for provisions for UxS is the Code of Safety for Dynamically Supported Craft. The Code defines Dynamically Supported Craft as a “craft which is operable on or above water and which has characteristics so different from those of conventional displacement ships.”⁶² While it would not currently apply because of a passenger requirement,⁶³ the provision may provide a model for a future provision focused on UxS.

Figure 8: Scope of the Polar Code⁶⁴



Because Luke operates solely in U.S. waters, he will be free to navigate, survey, and collect research without any limitations of foreign state sovereignty over the waters.

In the Northwest Passage

Similar to the governance over the Bering Strait, Article 234 also applies to the Northwest Passage. In our scenario, Luke will enter the Northwest Passage but stay within the U.S. EEZ off Alaska. If Luke were to navigate into the parts of the Northwest Passage that are claimed by Canada (although contested by the U.S.), the system may be subject to Canadian regulations. (See Figure 9). A bilateral negotiation between the two countries to agree on transit through this strait could solve this issue. The U.S. would rely on UNCLOS Article 38 that states “all ships and aircraft enjoy the right of transit passage, which shall not be impeded,” and empower Luke to survey and navigate. However, it is unclear if Luke has the freedom to collect data and resources from the area. This will be left to the bilateral negotiations between the two

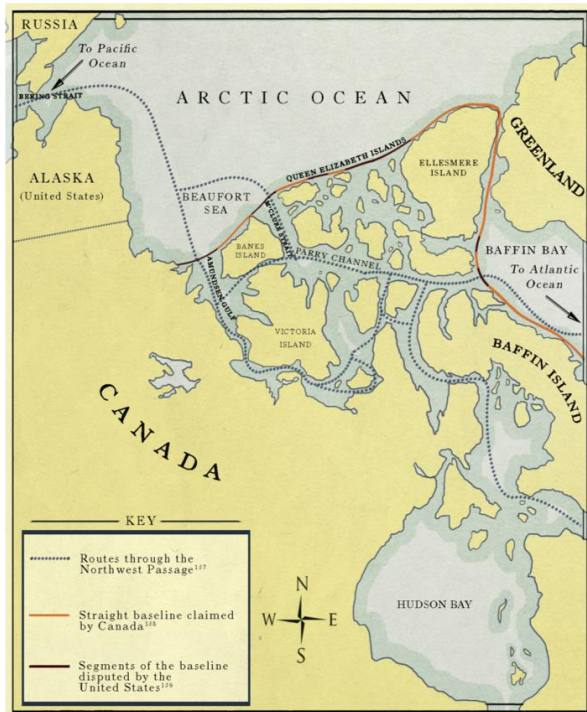
⁶² International Maritime Organization. (2013). *IMO- What it is* [Fact sheet]. https://www.wcdn.imo.org/localresources/en/About/Documents/What%20it%20is%20Oct%202013_Web.pdf

⁶³ *Id.*

⁶⁴ IMO Sub-Committee on Ship Design and Equipment (DE 54). (2011). *Polar Code Boundaries for the Arctic and Antarctic*. https://www.asoc.org/wp-content/uploads/2022/02/2011_Polar-Code-Boundaries-for-the-Arctic-and-Antarctic.pdf

countries. Recently, the two Arctic States held a dialogue regarding the Arctic where it was clear that both States had similar priorities of increasing international cooperation and safeguarding national and homeland security interests.⁶⁵ However, these conversations must continue, specifically regarding the Northwest Passage for a clearer agreement on access.

Figure 9: Northwest Passage Straight Lines that are Contested⁶⁶



Throughout Luke’s journey, because it is classified as a vessel, it will need to abide by the traffic collision control regulations set out in COLREGs.⁶⁷ Specifically, in the Northwest Passage, because it is a narrower strait in terms of navigability, as seen in Figure 10, and Luke is less than 20 meters in length, it shall not impede the passage of a vessel that can only navigate through a narrow channel or fairway.⁶⁸

Figure 10: Bering Strait Navigability in Comparison to Other Contested Areas⁶⁹

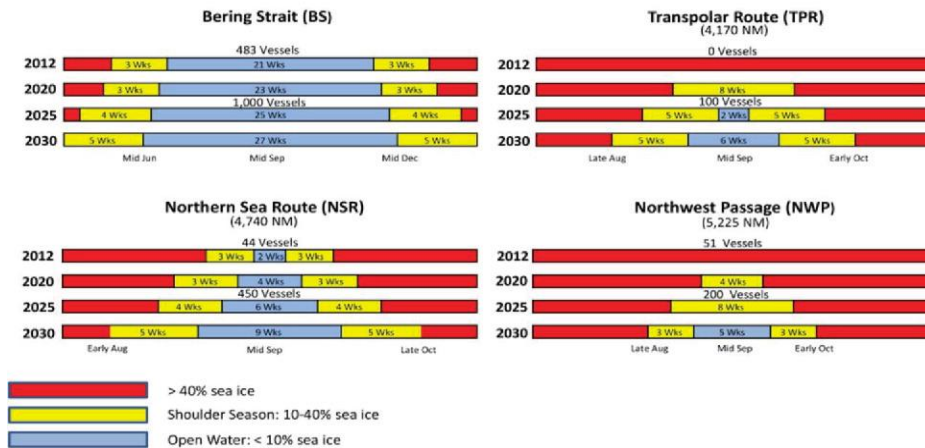
⁶⁵ U.S. Department of State. (2021, December 16). *The United States and Canada Hold Virtual Arctic Dialogue*. <https://www.state.gov/the-united-states-and-canada-hold-virtual-arctic-dialogue/>

⁶⁶ Note. (2020). The Potential-Use Test and the Northwest Passage. *Harvard Law Review* 133, 2579. <https://harvardlawreview.org/2020/06/the-potential-use-test-and-the-northwest-passage/>

⁶⁷ COLREGS.

⁶⁸ *Id.* Rule 9.; There is another contested area in the Arctic similar to the Northwest Passage, the Northern Sea Route, which the Russian Federation claims to be a part of its internal waters based on a claim of historic usage and lack of transits without prior authorization. Similarly, the U.S. asserts its usefulness for international navigation, however, obliges to Russia’s demand for transit authorization. For more information, see: Fletcher School. 2022. *Chapter 8: The Arctic & the LOSC*. <https://sites.tufts.edu/lawofthesea/chapter-eight/>

⁶⁹ *Id.*



Recommendations

In the Arctic region, it is clear there are gaps in the law and policy regarding UxS. Experts in various areas that work with these systems agree there is a need for change, especially because these systems are already in use. International collaboration can address these gaps through the following recommendations.

Recommendation 1: Create a U.S. interagency working group to assess the national use of UxS by the USCG, DoD, NOAA, FAA, and other agencies, and organize research and development of policies related to UxS. Because these groups are already using UxS, a consensus of uses, current and future needs will be most useful and applicable. With this consensus, the U.S. can better advocate for international policies to govern UxS.

Recommendation 2: Task a working group with the Arctic Council with studying the use of UxS in the region. Working groups are common with the Arctic Council to bring together the member states to focus on a particular issue. An UxS study could examine the current and possible future uses of UxS and the relevant monitoring and enforcement mechanisms that can be adapted in future conventions to adequately address the needs of users. Funding will be necessary to support a thorough study.

Recommendation 3: Fill the gap in policy regarding UxS. With the completion of recommendations 1 and 2, states can revisit conventions and bilateral agreements to include references and policies related to UxS. By writing UxS into UNCLOS, the Polar Code, and other agreements, these laws and regulations will be more up-to-date and better prepared for the UxS technologies of the future.