



UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

Natasha Mattsson Larsson

Protection of Digital Infrastructures in Areas Beyond
National Jurisdiction in International Law

Natasha Mattsson Larsson

Master's thesis (HRO800, 30 credits)

Supervised by Abhinayan Basu Bal

Master of Laws, Department of Law

School of Business, Economics and Law

at the University of Gothenburg

Fall / Winter 2022

Thank you,

Abhinayan Basu Bal, for the time and energy you have put into supporting me in the process of writing my master's thesis. Thank you for interesting perspectives and helpful questions, I could not have wished for a better supervisor.

Tack,

familj och vänner för stöd och påhejning under min tid på juristprogrammet. Tack pappa, för att du alltid uppmuntrar mig att ta mig an nya utmaningar: att *försöka*, även när något inledningsvis framstår som omöjligt. Tack mamma, för ihärdig stöttning, goda råd och för all tid du har lagt ned på korrekturläsning av mina texter genom åren. Tack Benjamin, för att du tror på mig oavsett vilken utmaning jag står inför. Tack Erik, mentors- och fadderkollegor samt vänner i Sveriges Juridiska Föreningar och HHGS, för en fantastiskt rolig studietid tillsammans och för det arbete vi utfört för vår och andras skull. Finally, thank you international friends, for sharing the adventure of a lifetime with me – in Italy and beyond.



We can only see a short distance ahead, but we can see plenty there that needs to be done.

– Alan Turing

Abstract

In this master's thesis, a bifocal approach is applied in order to investigate international law aspects of the protection of digital communications infrastructures in areas beyond national jurisdiction. The two focal areas are the international law of the sea and the international law of outer space, respectively. With regard to the law of the sea, the current protective legislation is analyzed, alongside its shortcomings and two suggestions on how to strengthen the current protection. There is no corresponding legislation protecting digital infrastructure in the international law governing outer space, but the author argues that there should be. Analogy reasoning, drawing inspiration from the law of the sea regime, is used in order to crystallize elements relevant to consider when developing rules on protection of digital infrastructure in outer space.

The analysis of the law of the sea shows that, at present, there are rules regarding the explicit protection of submarine cables in areas beyond national jurisdiction in international law, but that the efficiency of this order can be questioned. Some scholars have suggested that the protection may be strengthened through interpretation of provisions concerning piracy and maritime terrorism, and that related mechanisms enabling international cooperation could thereby become applicable to offenses targeting submarine cables. There is, however, no consensus on the matter. Based on the specific provisions analyzed, the author concludes that introducing a provision covering such offenses to the current anti-piracy and anti-terrorism regimes would not be inappropriate. It is also concluded that it is more likely that such offenses are currently covered by the provisions concerning piracy than the provisions regarding terrorism.

A comparison between the international law of outer space and the international law of the sea shows significant similarities between the two focal areas, which indicates that analogy reasoning is appropriate. Seeking a balance between the interests of State sovereignty and effective repression of offenses of common concern to the international community, the author suggests that: The protection of digital infrastructure in outer space should draw analogy from the explicit protection of submarine cables in areas beyond national jurisdiction in the international law of the sea, as well as the the anti-terrorism regime formulated in the *2005 Protocol to the convention for the suppression of unlawful acts against the safety of maritime navigation*. Finally, the author briefly sheds light on the difficulties of practical implementation of a multilateral treaty in the present law-making climate and suggests a soft law approach taking the private sector into account.

Table of Contents

Abstract	1
Table of Contents	2
Chapter 1. Protect Digital Infrastructure, Protect the Internet	4
1.1. Importance of Protective Legislation in Areas Beyond National Jurisdiction	4
1.2. Object and Scope	5
1.3. Method and Theoretical Considerations	6
1.3.1. First Focal Area: The International Law of the Sea	6
1.3.2. Second Focal Area: The International Law of Outer Space	7
1.4. Delimitations	9
1.4.1. Geographical delimitation: Areas Beyond National Jurisdiction	9
1.4.2. Functional Delimitation: Telecommunications Services	9
1.4.3. Delimitation Based on the Type of Threat: Human Interference	10
Chapter 2. What Is Infrastructure, Why Is Infrastructure?	11
2.1. What Is Digital Infrastructure?	11
2.2. Digital Infrastructures Enable High-Speed Internet Connection	11
2.3. An Attractive Target for Acts of Terrorism and Other Intentional Attacks	13
2.4. Potential Consequences of an Attack on Digital Infrastructure	15
2.5. Digital Infrastructure in Outer Space Is in Need of Protection	16
2.6. Threats to Digital Infrastructures at Sea and in Outer Space	17
Chapter 3. The International Law of the Sea	20
3.1. Marine Areas Beyond National Jurisdiction	20
3.2. Principles Governing Marine Areas Beyond National Jurisdiction	21
3.2.1. Principles Governing the Area	22
3.2.2. Principles Governing the High Seas	22
3.3. Legal Protection of Infrastructure in Areas Beyond National Jurisdiction	24
3.3.1. The 1884 Convention for the Protection of Submarine Telegraph Cables	25
3.3.2. The 1958 Geneva Convention on the High Seas	26
3.3.3. The 1982 United Nations Convention on the Law of the Sea	26
3.3.4. Comparing Regulations: Flag State Responsibility and the Right of Visit	27
3.4. Flags of Convenience	28
3.5. Critique Against the Current Order for Protection of Digital Infrastructure	29
3.6. Possible Solutions to Ineffective Flag State Jurisdiction	30
3.7. Analysis of the Two Main Suggestions Regarding Strengthened Protection	32
3.7.1. Why Is There a Need for Rules on Piracy in International Maritime Law?	32
3.7.2. Why Is There a Need for Rules on Terrorism in International Maritime Law?	33
3.7.3. Piracy: Comments on the Scope of Article 101 UNCLOS	35
3.7.4. Terrorism: Comments on the Scope of Article 3bis(1)(a)(iii) 2005 SUA	39

3.7.5. Consequences of Applying the Anti-Terrorism Regime	43
3.7.6. Consequences of Applying the Anti-Piracy Regime	45
3.8. Protection of Submarine Cables During Armed Conflict	46
3.9. Summary: Protection of Submarine Cables in International Law	47
Chapter 4. The International Law of Outer Space	49
4.1. Elements of the Area and the High Seas in International Outer Space Law	49
4.1.1. The Principle of Non-Appropriation and the Role of the Flag State	51
4.2. Influences from the International Law of the Sea	53
4.3. Location of Satellites	54
4.4. Comparison: Threats to Digital Infrastructures at Sea and in Outer Space	55
4.4.1. Damage Caused Through Culpable Negligence	55
4.4.2. Intentional Damage	56
4.4.3. Cyber Crime	57
4.5. Analogical Reasoning from Sea to Outer Space	57
4.5.1. Flag State Jurisdiction in Relation to Protection of Digital Infrastructure	58
4.5.2. International Cooperation: The Piracy Analogy	59
4.5.3. International Cooperation: The Terrorism Analogy	60
4.5.4. Clarifications on the Status of Digital Infrastructure During Armed Conflict	61
4.6. Institutional Aspects	62
4.6.1. The Stagnation of International Law-Making	62
4.6.2. The U.S. Perspective on International Law-Making and Outer Space Law	64
4.6.3. The Law of the Sea Does Not Follow the Trend	65
4.6.4. Involving Non-State Actors in the Development of Soft Law Instruments	67
Chapter 5. Conclusion	68
List of References	71

Chapter 1. Protect Digital Infrastructure, Protect the Internet

Imagine a normal day: You wake up, check the weather and the news, scroll social media and leave the house. You use an app to buy a bus ticket and another one to listen to music. When you arrive at work, you have digital meetings, send emails, do some research and give a presentation using tools you have accessed online. At home you spend some time streaming a show before going outside, pausing your car parking in an app and driving to the store, where you pay with your phone. A friend texts you via Messenger, another one calls you on WhatsApp. At night you tell *Siri* or *Alexa* to set an alarm for the morning, brush your teeth with a toothbrush you have ordered online and transfer the month's rent to your landlord. What would your life be like without internet access?

Providing services produced in outer space for utilization on Earth currently makes up the vast majority (95%) of revenue stemming from non-State-actors' activities in outer space. Such space activities include using commercial satellites in the Earth's atmosphere in order to provide telecommunications services, like internet access, on Earth. Development is moving quickly in the outer space field, especially in the private sector: Non-State companies are now able to send people to outer space, and plan to do so on a great scale in the near future. Consequently, it is likely that the demand for services provided in outer space for utilization in outer space will increase. Companies are eager to meet such demand when it arises, and thereby to capitalize on the wish for a certain standard of living in outer space.¹ Considering this, the question of outer space activities is increasingly relevant: not only from an economic perspective, but also from a legal one. How should such activities be regulated?

1.1. Importance of Protective Legislation in Areas Beyond National Jurisdiction

Everyday, people around the world use the Internet. The Internet is essential for the economy and national security, it is also widely used for communication, commerce, entertainment and more. Stable high-speed internet connection is provided via digital infrastructure, mainly fiber-optic cables under the sea and satellites in the Earth's atmosphere.² These are physical structures using advanced technology to transfer information within and between countries and continents. Submarine cables currently transmit the vast majority of digital communications worldwide and satellites are especially important for reaching remote areas not yet connected to cables.³ Because the proper functioning of digital communications infrastructure is essential for both public and private actors, damage to such structures – potentially resulting in significantly slower internet service or complete internet blackouts – could have a serious impact on the economy, national security and the every-day lives of

¹ Matthew Weinzierl & Mehak Sarang. 'The Commercial Space Age Is Here'. *Harvard Business Review*. 2021-02-12. <https://hbr.org/2021/02/the-commercial-space-age-is-here> (Gathered 2022-11-18).

² John Spacey. '13 Examples of Digital Infrastructure'. *Simplicable*. 2017-10-17. <https://simplicable.com/new/digital-infrastructure> (Gathered 2022-09-12).

³ Damian M. Bielicki. 'Legal Aspects of Satellite Constellations'. *Air and space law*. Vol. 45(3): 2020. p. 245-264. p. 262.

people working and living in the areas affected. Considering the great significance of telecommunications services, it is important to have effective mechanisms in place for the protection of digital infrastructures enabling such services. As the following example indicates, this is especially true for structures located in areas beyond national jurisdiction.

Google owns a transatlantic submarine cable, *Dunant*. The cable is 6 400 kilometers long and stretches between the U.S. and France, with landing points on Virginia Beach and Saint-Hilaire-de-Riez.⁴ Suppose two people want to damage this cable in order to impede transmission of digital information between the U.S. and Europe. One person cuts the cable close to the coast of France and the other person cuts it far out on the North Atlantic Ocean. French authorities arrest, try and punish the first person. Will the second person be able to escape consequences due to the fact that the actions took place on international water, in an area beyond national jurisdiction?

When a crime is committed within the national jurisdiction of a State – be it on its land territory, in its air space or within the limits of its territorial sea – it is generally considered a concern of that particular State. If the offense, however, is committed in an area beyond national jurisdiction, such as the high seas or outer space, the matter becomes more complicated. As to avoid a situation where areas beyond national jurisdiction become safe havens for crime targeting critical infrastructures, it is important to develop an efficient protective international law regime covering these areas. Submarine cables and satellites currently represent the two major digital infrastructures facilitating telecommunications services. Therefore, this thesis targets, in particular, the protection of digital infrastructures at sea and in outer space in international law.

1.2. Object and Scope

The object of this thesis is to investigate the protection of digital infrastructure in the international law of the sea as well as if, and how, this order can be used to fill gaps in the international law governing outer space. More specifically, the aim is to propose ways in which the protection of digital infrastructure beyond the national jurisdiction of States in the international law of the sea can be used to develop future legislation for the protection of digital infrastructure in outer space. The analysis is based on the following three questions:

1. In the international law of the sea, what constitutes the explicit protection of digital infrastructure located in maritime zones beyond national jurisdiction?
2. In the international law of the sea, what are some possible expansions on the explicit protection of digital infrastructure in areas beyond national jurisdiction? What elements make these additions valuable in the context of strengthening the protection for digital infrastructures in areas beyond national jurisdiction?

⁴ TeleGeography. 'Submarine Cable Map'. *TeleGeography*.
<https://www.submarinecablemap.com/submarine-cable/dunant> (Gathered 2022-10-12).

3. Based on the protection of digital infrastructure in areas beyond national jurisdiction in the international law of the sea, which elements would be appropriate to incorporate into an international law regime protecting digital infrastructure located in outer space?

1.3. Method and Theoretical Considerations

This master's thesis consists of two parts which, in different ways, approach the issue of legal protection of digital communications infrastructures in areas beyond national jurisdiction: One analysis *de lege lata*, which concerns the international law of the sea, and one analysis *de lege ferenda* which regards the international law of outer space. Hence, the protection of digital infrastructure in international law is analyzed using a bifocal approach. The analysis in the first part (law of the sea) is used as a base for analogy reasoning in the second part (law of outer space), thereby tying the two focal areas – sea and outer space – together. The analytical parts of the thesis are preceded by a chapter which provides an in-depth understanding of the functions of digital infrastructures and the significance of efficiently protecting such structures in international law.

1.3.1. First Focal Area: The International Law of the Sea

The first analytical part, *Chapter 3*, concerned the international law of the sea. It examined the current legislation in international maritime law which expressly protects digital communications infrastructure (submarine cables) in marine areas beyond national jurisdiction from damage caused by humans, intentionally or through culpable negligence. An understanding of the context in which these provisions exist was provided: Rules and principles of central importance in marine areas beyond national jurisdiction, challenges connected to the protective order in the law of the sea, and possible solutions to relevant shortcomings were analyzed.

Thereafter, two suggestions on how to strengthen the protection of digital infrastructure at sea using already existing provisions in international maritime law, which do not explicitly mention submarine cables, were analyzed. These suggestions have previously been discussed in legal doctrine. The author's personal contribution was to crystallize the underlying principles and purposes of the relevant provisions, as well as the potential consequences of applying them in international law. The goal was not primarily to come to a conclusion regarding the current applicability of those provisions to offenses targeting submarine cables, but rather to investigate if, and in which ways, they could serve as an appropriate source of inspiration for development of a protective international law regime applicable to digital infrastructure located in outer space.

De lege lata argumentation, which describes the overall character of the first analysis, uses legal sources to determine the meaning of the law currently in force, i.e. the proper interpretation and application of positive law. In international law, the legal sources are

international conventions, international custom, general principles and, as subsidiary means of determination of law, judicial decisions and legal doctrine.⁵ With regard to legal sources, the point of departure for the *de lege lata* analysis of this thesis were provisions of international conventions and the principles which they express. The meaning of these sources were analyzed using legal doctrine on the matter and, for contextual purposes, comments in preparatory work.

International conventions are normally interpreted in accordance with the 1969 *Vienna Convention on the Law of Treaties* (VCLT), and the central provisions on treaty interpretation therein, Articles 31 and 32, reflect customary international law.⁶ The Vienna Convention states that treaty interpretation shall be done in accordance with the ordinary meaning of the terms, in their context and in light of their object and purpose.⁷ Hence, at the heart of treaty interpretation is the text itself. Materials which may guide the interpretation are the Preamble and Annexes of the treaty, agreements concluded in connection with the treaty, subsequent agreements or practice between the Parties, and any other rules of international law applicable between the Parties.⁸ If the interpretation leads to ambiguous results, findings may be confirmed using preparatory work and the circumstances of the conclusion of the treaty.⁹ In this part, the analysis was guided by these rules on interpretation and thus mainly focused on the meaning of the specific words of the provisions used, viewed in their broader context.

1.3.2. Second Focal Area: The International Law of Outer Space

The second analytical part of the thesis, *Chapter 4*, regarded the international law governing outer space. In *Chapter 4*, the findings from *Chapter 3* were used as a point of departure for an analysis concerning the possibilities of using existing international maritime law on the protection of digital infrastructure in areas beyond national jurisdiction, to create legislation on the same matter in outer space. The two focal areas, sea and outer space, were compared and the appropriateness of transferring ideas from one part of international law to another in this context was discussed. Lastly, material elements to include when formulating legislation regarding the protection of digital infrastructure in outer space were crystallized and light was shed on the practical challenges of implementing a multilateral treaty on this, or any, matter in the present international law-making climate.

In order to make a statement expressing that something *should* be part of positive law, one needs to make an assumption of what rules are fit to constitute legal rules in the first place. Hence, *de lege ferenda* argumentation is closely intertwined with the perception of the communicator. Usually, this is not the case for *de lege lata* argumentation, as the main

⁵ *Statute of the International Court of Justice*. 1946. Article 38.

⁶ International Law Commission. *Report of the International Law Commission on the work of its sixty-fifth session*. 2013. p. 18.

⁷ *Vienna Convention on the Law of Treaties*. 1969. Article 31.

⁸ *Vienna Convention on the Law of Treaties*. 1969. Article 31(2)-(3).

⁹ *Vienna Convention on the Law of Treaties*. 1969. Article 32.

purpose of such a contribution is to shine light on what is already in place.¹⁰ Professor Jan Hellner identifies three ways of arguing *de lege ferenda*: The first form concerns retrospection, which is used in order to codify older law or to utilize previous experiences in order to develop new legislation. The second form is a goal-oriented approach, the formulation of law with the purpose of reaching a certain goal. In both cases, it is important, with regard to scientific reliability, that the author does not discard valid arguments pointing in another direction than the overall line of argumentation. The third form consists of a general expression of opinions (“allmänt tyckande”).¹¹ The present thesis used previous knowledge, recognized sources of international law and already existing formulations of relevant legal rules as a base for its suggestions. The author aimed for scientific reliability and, therefore, transparently examined different arguments and perspectives before drawing conclusions of her own.

De lege ferenda argumentation can be more or less bound. According to Hellner, several factors, including the purpose of the proposed suggestion and its relation to already existing law, determine the extent to which such argumentation is “bound” or “free”. Hellner explains that there is a tendency, when seeking to formulate new legislation, to take inspiration from law already in place. There are several possible explanations to this, for example the search for equity (the idea that cases which are alike should be treated alike), the convenience of applying common principles to connected areas of law, and the technical benefit of constructing a provision according to a pattern which has already been successfully tested.¹² These considerations became prominent in the second part of this thesis, as the *de lege ferenda* analysis was based on analogical reasoning.

Analogical reasoning rests on the idea that similar cases may be treated in a similar manner: that existing and well-trying knowledge can be used to develop, or fill lacunas in, similar domains. On the contrary, different cases are not fit for application of an analogy.¹³ Therefore, before suggesting a certain development of international outer space law based on the international law of the sea, this author considered it crucial to determine whether the focal areas were *similar* or not. At the core of any serious analogy is a careful comparison between the source domain and target area, in this case sea and outer space. When attempting such a comparison it is helpful to map key features in each area and to imagine a possible analogy in the context of the target area in order to make sure it fits. This is a way of avoiding “blindness” to potentially important differences between the two domains.¹⁴ It should be noted that reasoning by analogy is not the act of copying a specific rule and applying it to the

¹⁰ Hugh Thirlway. ‘REFLECTIONS ON *LEX FERENDA*’. *Netherlands Yearbook of International Law*. Vol. XXXII: 2001. p. 3-26. p. 4.

¹¹ Jan Hellner. ‘Argumentation de lege ferenda’. *Svensk Juristtidning*. 1975: p. 401-420. p. 407.

¹² Hellner. ‘Argumentation de lege ferenda’. p. 406.

¹³ Sandesh Sivakumaran. ‘Techniques in International Law-Making: Extrapolation, Analogy, Form and the Emergence of an International Law of Disaster Relief’. *European Journal of International Law*. Vol. 28(4): 2017. p. 1097-1132. p. 1116-1120.

¹⁴ M. J. Peterson. ‘The Use of Analogies in Developing Outer Space Law’. *The MIT Press*. Vol. 51(2): 1997. p. 245-274. p. 248-252.

target area, but rather to discern the general principles interwoven in the rule and to transfer that idea to a similar situation.¹⁵

Because the argumentation *de lege ferenda* in this thesis was conditioned by the similarities – or potential lack thereof – between the international law of the sea and the international law governing outer space, it was significantly bound. The analysis was based on a careful comparison between the two focal areas and both similarities and differences were taken into account. As a bifocal approach was applied, reasoning by analogy became a useful tool in creating connections between the two focal areas, sea and outer space.

1.4. Delimitations

For the scope of this master's thesis, delimitations were made. The central issue was protection of digital infrastructures located in areas beyond national jurisdiction, especially those providing digital communications services. The primary threats explored were those posed by human intervention. In the following, these delimitations are motivated shortly.

1.4.1. Geographical delimitation: Areas Beyond National Jurisdiction

Technology for space travel and different uses of outer space is advancing every day, something that will likely increase the dependency on digital infrastructure located in outer space in the near future. In contrast to the international law of the sea, which is very comprehensive, the international law governing outer space is currently quite general and does not include specific provisions on the protection of digital infrastructure. In this thesis, analogy reasoning was applied in order to draw inspiration from the law of the sea and transfer it to outer space law and, in order to utilize the method of analogy reasoning, the two focal areas had to be *similar*. Thus, as outer space in its entirety is considered an area beyond national jurisdiction,¹⁶ it was compared to marine areas beyond national jurisdiction.

1.4.2. Functional Delimitation: Telecommunications Services

Submarine cables and satellites both have other functions than facilitating telecommunications services, for example transferring electricity and providing useful information about the weather. Telecommunication services, however, constitute a central function which is shared by digital infrastructures at sea and in outer space, thereby making them comparable in terms of capacity, costs, challenges, etcetera. Moreover, access to fast and reliable internet connection is an important societal function which is essential to many different actors. The potential consequences of digital infrastructures being damaged, in terms of loss of internet access, was considered an important motivating factor for the need for proper protection of digital infrastructure in areas beyond national jurisdiction. Finally, it

¹⁵ Sivakumaran. 'Techniques in International Law-Making: Extrapolation, Analogy, Form and the Emergence of an International Law of Disaster Relief'. p. 1120-1121.

¹⁶ *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*. 1967. Article II.

is likely that data will remain the chief focus for private actors attempting to gain value from space activities in the next five to ten years.¹⁷ As such actors are of central importance to the current developments in the outer space field, their interests and impact are relevant factors to consider when developing strategies on outer space matters.

1.4.3. Delimitation Based on the Type of Threat: Human Interference

The thesis targets damage caused by humans, intentionally or through culpable negligence, rather than damage caused by, for instance, natural phenomena. Including damage caused by humans was necessary in order to address terrorism and piracy in this context. Moreover, in contrast to natural phenomena like earthquakes and tsunamis, this type of threat is something that States can actually make a punishable offense. Implementation of effective legislation on the matter therefore indicates a decrease of offenses targeting digital infrastructure in areas beyond national jurisdiction.

¹⁷ Matthew Weinzierl, Prithwiraj (Raj) Choudhury, Tarun Khanna, Alan MacCormack & Brendan Rosseau. 'Your Company Needs a Space Strategy. Now.'. Harvard Business Review. 2022-11. <https://hbr.org/2022/11/your-company-needs-a-space-strategy-now> (Gathered 2022-11-18).

Chapter 2. What Is Infrastructure, Why Is Infrastructure?

What is digital infrastructure and why is it important? Why does digital infrastructure break? Why is it necessary to protect digital infrastructure and which are the threats? This chapter provides an understanding of the sociological importance of digital infrastructures and the challenges such structures face in areas beyond national jurisdiction, both at sea and in outer space. This insight to the practical functions of, and threats to, digital infrastructures favors the understanding of the themes analyzed in the following *Chapters 3-5*.

2.1. What Is Digital Infrastructure?

Infrastructure enables basic societal functions, for instance transportation and electrical power.¹⁸ Usually, the term “infrastructure” is used to refer to “hard” infrastructure like roads, bridges and dams. Sometimes also “soft” infrastructure, like healthcare and law enforcement, is covered by the term.¹⁹ *Digital* infrastructure is a type of hard infrastructure: It consists of physical structures, which are necessary to facilitate information technology, i.e. the creation, processing, transmission and storage of data.²⁰ Hence, digital communications such as telephone calls and internet usage are made possible through digital infrastructure.²¹

Digital infrastructure has become indispensable to the functioning of society and the quality of life of its citizens.²²

A common denominator for different types of infrastructures is that the structures are usually hidden, supporting a broad range of tasks while being invisible to its users. Consequently, frequent users do not engage much thought in the processes behind different tasks, such as traveling by train, flicking a light switch or using a computer: In this sense the functions, and the infrastructure enabling them, are taken for granted. Nonetheless, infrastructure can easily become visible to users when it stops working: When the train stops moving, when there is a power shortage or when the computer suddenly fails to connect to the internet.²³

2.2. Digital Infrastructures Enable High-Speed Internet Connection

Since its early developments in the 1960s and its popularization among the general public, starting with the birth of the World Wide Web in the 1990s, the Internet has come a long

¹⁸ Merriam-Webster. 'Infrastructure'. *Merriam-Webster*.

<https://www.merriam-webster.com/dictionary/infrastructure> (Gathered 2022-10-12).

¹⁹ Investopedia. 'Infrastructure: Definition, Meaning, and Examples'. *Investopedia*. 2022-07-14.

<https://www.investopedia.com/terms/i/infrastructure.asp> (Gathered 2022-10-12).

²⁰ Rich Castagna. 'Information technology (IT)'. *TechTarget*.

<https://www.techtarget.com/searchdatacenter/definition/IT> (Gathered 2022-10-12).

²¹ John Spacey. '13 Examples of Digital Infrastructure'. *Simplicable*. 2017-10-16.

<https://simplicable.com/new/digital-infrastructure> (Gathered 2022-10-12).

²² Designs Buildings. 'Digital infrastructure'. *Designs Buildings*. 2022-08-18.

https://www.designingbuildings.co.uk/wiki/Digital_infrastructure (Gathered 2022-10-12).

²³ Susan Leigh Star & Geoffrey C. Bowker. 'How to Infrastructure' in *The Handbook of New Media*. London: SAGE Publications. 2006. p. 231.

way.²⁴ Today, 63,1% of the World's population use the Internet and the number is growing by approximately 4% each year. On average, users spend seven hours online every day and by the second half of 2023, two thirds of the World's population are expected to be connected to the Internet.²⁵

In 2014, Stephen Hawking said that “[w]e are all now connected by the Internet, like neurons in a giant brain”,²⁶ and the Internet is clearly essential for many around the world. Both private and public actors are heavily dependent on connectivity: Apart from social media and digital meetings, high speed internet connection is imperative for online-based commerce, banking and national security.²⁷ Additionally, it is a useful tool for community building purposes and it provides platforms to further interests such as the preservation of threatened indigenous languages.²⁸ During the Covid-19 pandemic, there was a significant societal shift where remote working, online teaching and digital meetings became increasingly popularized. In a study conducted in Serbia, 67,2% of the participating internet users reported an increase in their online activity during the pandemic.²⁹ In conclusion, there is undoubtedly an overall societal dependence on telecommunications services, especially reliable high-speed internet connection (broadband).

High speed internet connection is made possible through digital infrastructures such as telecommunications cables located under the sea and satellites in the Earth's atmosphere.³⁰ Submarine cables are fiber-optic cables laid down on the ocean floor, which transport data within and between countries and continents. There are currently over 400 submarine cables worldwide, creating a network responsible for transmitting approximately 99% of the World's digital communications.³¹ Therefore, the proper functioning of submarine cables is essential to different public and private actors, in different sectors, worldwide. One example is the economy sector: As they are used for transactions amounting to trillions of USD every day,

²⁴ Evan Andrews. 'Who Invented the Internet?'. *History*. 2019-10-28.
<https://www.history.com/news/who-invented-the-internet> (Gathered 2022-09-12).

²⁵ DataReportal. 'Digital Around the World'. *DataReportal*.
<https://datareportal.com/global-digital-overview> (Gathered 2022-09-12).

²⁶ Jon Swartz. 'Q&A with Stephen Hawking'. *USA Today*. 2014-12-02.
<https://eu.usatoday.com/story/tech/2014/12/02/stephen-hawking-intel-technology/18027597/>
(Gathered 2022-10-03).

²⁷ Christian Bueger, Tobias Liebetrau & Jonas Franken. *Security threats to undersea communications cables and infrastructure – consequences for the EU*. Policy Department for External Relations Directorate General for External Policies of the Union, 2022-06. p. 12.

²⁸ Leigh Star & C. Bowker. 'How to Infrastructure' in *The Handbook of New Media*. London: SAGE Publications Ltd. 2006. p. 241.

²⁹ Jelena Jovic, Maja Pantovic-Stefanovic, Marija Mitkovic-Voncina, Bojana Dunjic-Kostic, Goran Mihajlovic, Srdjan Milovanovic, Maja Ivkovic, Andrea Fiorillo & Milan Latas. 'Internet use during coronavirus disease of 2019 pandemic: Psychiatric history and sociodemographics as predictors'. *Indian Journal of Psychiatry*. Vol. 62 (9): 2020-09-28. p. 383-390.

³⁰ Spacey. '13 Examples of Digital Infrastructure'.

³¹ Bueger, Liebetrau & Franken. *Security threats to undersea communications cables and infrastructure – consequences for the EU*. p. 12.

submarine cables have been described as the “backbone of the global economy”.³²

The submarine data cable network is probably the most fundamental item of international critical infrastructure one could imagine.³³

The remaining 1% of the World’s digital communications rely upon satellites in the Earth’s atmosphere. Using submarine cables to transmit international telecommunications services is currently considered faster, more reliable and less expensive than using satellites for the same purpose.³⁴ However, the importance of satellites should not be discarded: For instance, they further the possibilities of smaller territories to stay online while facing the risk of possible internet blackouts following cable failure.³⁵ They are also essential for reaching remote areas not yet connected to submarine cables.³⁶

2.3. An Attractive Target for Acts of Terrorism and Other Intentional Attacks

In 1858, the first functioning transatlantic telegraph cable was laid down between the UK and the U.S. At the successful arrival of a message from Queen Victoria to the American president, festivities were initiated and, by many, the technology was considered nothing short of magic.³⁷ Today, few would be this impressed by a message successfully traveling across the Atlantic, yet cyberspace is often described as something abstract, not too far from magic. Importantly, data is not a result of magic: It relies upon actual, physical infrastructure for its effective transportation, and such structures can, for different purposes and by different means, be injured.

Traditionally, important infrastructures have been strategic targets for acts of terrorism. In particular, energy infrastructure has been targeted in the past.³⁸ In a 2010 resolution, the United Nations General Assembly described submarine cables as “critical communications infrastructure” and encouraged States to further seek cooperation on matters of submarine

³² Bueger, Liebetrau & Franken. *Security threats to undersea communications cables and infrastructure – consequences for the EU*. p. 12.; Douglas Guilfoyle, Tamsin Phillipa Paige & Rob McLaughlin. ‘THE FINAL FRONTIER OF CYBERSPACE: THE SEABED BEYOND NATIONAL JURISDICTION AND THE PROTECTION OF SUBMARINE CABLES’. *The International and comparative law quarterly*. Vol. 71 (3): p.657-696. p. 659.

³³ Rob McLaughlin, Tamsin Phillipa Paige & Douglas Guilfoyle. ‘Submarine Communication Cables and the Law of Armed Conflict: Some Enduring Uncertainties, and Some Proposals, as to Characterization’. *Journal of Conflict & Security Law*. 2022-04-21. p. 33.

³⁴ Michael Sechrist. ‘Cyberspace in Deep Water: Protecting the Arteries of the Internet’. *Kennedy School Review*. Vol.10, 2010: p. 40; Bueger, Liebetrau & Franken. *Security threats to undersea communications cables and infrastructure – consequences for the EU*. p. 13.

³⁵ Dan Swinhoe. ‘Tonga’s international subsea cable repaired after volcanic eruption’. *DatacenterDynamics*. 2022-02-22.

<https://www.datacenterdynamics.com/en/news/tongas-international-subsea-cable-repaired-after-volcanic-eruption/> (Gathered 2022-09-06).

³⁶ Bielicki. ‘Legal Aspects of Satellite Constellations’. p. 262.

³⁷ Sechrist. ‘Cyberspace in Deep Water: Protecting the Arteries of the Internet’. p. 40.

³⁸ Marcus Matthias Keupp (ed.). *The Security of Critical Infrastructures: Risk, Resilience and Defense*. Cham: Springer International Publishing AG. 2020. p. 2.

cable protection.³⁹ Considering the current, and successively increasing, importance of digital infrastructures like submarine cables and satellites, such structures might be attractive targets for sabotage. For instance, the European Parliament recognizes a possibility of submarine cables being targeted in an attempt to harm overseas EU naval bases, located in areas where terrorist attacks have occurred in the past.⁴⁰ Legal scholars have also shed light on the fact that the strategic importance of submarine cables might lead to them being targeted by terrorist groups.⁴¹ It has been noted that “dry parts” of submarine cables, which are located on land, are especially vulnerable.⁴² However, intentional damage can also occur at sea: In 2008, three scuba divers were arrested off Egypt for trying to cut an important submarine cable, carrying one third of all internet capacity connecting Egypt to Europe.⁴³ In the previous year, 2007, fishermen outside Vietnam came close to causing serious disruptions in Vietnam’s international digital communications, by hauling submarine cables with the presumed intent to sell the materials for scrap.⁴⁴

On the 26th of September 2022, submarine pipelines Nord Stream 1 and 2, transporting gas between Russia and Germany, started leaking. According to German governmental sources, it was likely an intentional attack.⁴⁵ The same view was presented by Swedish prime minister Magdalena Andersson and Danish prime minister Mette Frederiksen in press conferences on the matter. Andersson held that the leak was most likely a consequence of sabotage, a deliberate act, but that it should not be considered an attack on Sweden or Denmark as such. In this regard she explained that the pipeline was damaged in the exclusive economic zones of the two States, rather than within the limits of the territorial waters, and that neither of the States owns the pipelines in question.⁴⁶ In a similar manner, the Danish minister of defense,

³⁹ United Nations. *Resolution 65/37 adopted by the General Assembly*. 2010-12-07. para 121.

⁴⁰ Bueger, Liebetrau & Franken. *Security threats to undersea communications cables and infrastructure – consequences for the EU*. p. 34.

⁴¹ Stuart Kaye. ‘International measures to protect oil platforms, pipelines, and submarine cables from attack’. *Tulane Maritime Law Journal*. Vol. 31(2), 2007: p. 377-424. p. 418.

⁴² Lixian Loong Hantover. ‘The Cloud and the Deep Sea: How Cloud Storage Raises the Stakes for Undersea Cable Security and Liability’. *Ocean and Coastal Law Journal*. Vol. 19(1), 2013: p. 1-28. p. 9.

⁴³ Charles Arthur. ‘Undersea internet cables off Egypt disrupted as navy arrests three’. *The Guardian*. 2013-03-28. <https://www.theguardian.com/technology/2013/mar/28/egypt-undersea-cable-arrests> (Gathered 2022-09-10).

⁴⁴ Cabling installation & maintenance. ‘A high-definition touchdown for Michigan State stadium project: short runs’. *Cabling installations & maintenance*. 2007. <https://www.cablinginstall.com/home/article/16467655/a-highdefinition-touchdown-for-michigan-state-stadium-project> (Gathered 2022-09-06); Gregg Keizer. ‘Fishermen pull the plug on Vietnam's Web, steal cable for scrap’. *Computerworld*. 2007-06-07. <https://www.computerworld.com/article/2541664/fishermen-pull-the-plug-on-vietnam-s-web--steal-cable-for-scrap.html> (Gathered 2022-09-06).

⁴⁵ Ida Persson. ‘Uppgifter: Nord Stream-läckor kan ha varit medveten attack’. *SVT Nyheter*. 2022-09-27. <https://www.svt.se/nyheter/inrikes/nord-stream-lackan-kan-ha-varit-medveten-attack> (Gathered 2022-09-29).

⁴⁶ Sveriges Radio. ‘Magdalena Andersson: Nord Stream leaks most likely sabotage’. *Sveriges Radio*. 2022-09-28. <https://sverigesradio.se/artikel/magdalena-andersson-nord-stream-leaks-most-likely-sabotage> (Gathered 2022-10-12).

Morten Bødskov, held that “the defense intelligence service does not consider that there is an increased military threat to Denmark”.⁴⁷

This situation clearly illustrates how infrastructure is hidden until it breaks. The Nord Stream 1 pipeline has been active since 2011,⁴⁸ and for many years it has worked in hiding until the leak unveiled it. The leak did not only cause a disruption in gas supply to Europe, but also resulted in a great amount of methane leaking into the surrounding waters.⁴⁹ These consequences have brought the infrastructure out into the light, to the attention of the international community. Furthermore, Andersson ruling out the possibility of the attack targeting Sweden or Denmark, due to the leak occurring beyond the territorial sea of these States, reflects the fact that the location of damage is crucial to how it is treated and viewed. What reaction can be expected when an attack takes place in an area beyond national territory, or completely beyond national jurisdiction of States?

In international maritime law, submarine cables (transporting data and electricity) and pipelines (transporting oil, gas and water) are often treated in a similar manner and regulated in the same provisions. Therefore, the author holds that potential sabotage of this capacity targeting a pipeline, should alert the international community also of the threats to submarine cables and other critical infrastructures.

2.4. Potential Consequences of an Attack on Digital Infrastructure

Due to the placement and intricate construction of modern digital infrastructure, repairs can be a costly and lengthy process reaching from hours up to several weeks. Normally, it is the responsibility of private actors to pay for repairs.⁵⁰ Additionally, the impact of the functions of digital communications infrastructure being out of order during an uncertain period of time can have noticeable effects on the economy, security and on the every-day life of people in areas affected by the disruption. In some cases, damage to digital infrastructure might even cause an internet “blackout”, a complete loss of connectivity in the affected territory.

Given the fact that cables, for various reasons, tend to break, operators are generally prepared to reroute transmissions in case of a cable failure. Such preparations, however, are usually not intended to cover a situation where several cables are damaged or cut at the same time. Therefore, if an intentional attack, for example by terrorists or pirates, targets multiple cables simultaneously (including the re-routing cable) the result could be a palpable loss of data

⁴⁷ Xinhua. ‘Danish PM: Nord Stream pipeline leaks “deliberate actions”’. *Global Times*. 2022-09-29. <https://www.globaltimes.cn/page/202209/1276405.shtml> (Gathered 2022-10-12).

⁴⁸ Nord Stream. ‘The Pipeline’. *Nord Stream*. <https://www.nord-stream.com/the-project/pipeline/> (Gathered 2022-10-12).

⁴⁹ Laura Benshoff. ‘The Nord Stream pipelines have stopped leaking. But the methane emitted broke records’. *NPR*. 2022-10-04. <https://www.npr.org/2022/10/04/1126562195/the-nord-stream-pipelines-have-stopped-leaking-but-the-methane-emitted-broke-rec> (Gathered 2022-10-12).

⁵⁰ Loong Hantover. ‘The Cloud and the Deep Sea: How Cloud Storage Raises the Stakes for Undersea Cable Security and Liability’. p. 13-14.

access.⁵¹ While it is unlikely that such an action would cause an internet blackout affecting an entire country or continent, islands and smaller territories are more vulnerable. In early 2022, for example, a volcano eruption followed by tsunamis caused significant damage to both domestic and international submarine cables connecting the island of Tonga to nearby islands and the rest of the World. The breakage seriously hampered internet connection and connectivity became reliant on satellites until the international cable was repaired over two weeks later.⁵²

2.5. Digital Infrastructure in Outer Space Is in Need of Protection

In the international law of the sea, there is currently protective legislation in place covering digital communications infrastructure (submarine cables) located in areas beyond national jurisdiction. Provisions expressly dealing with intentional damage, and damage caused through culpable negligence, can be found in the multilateral treaty on the matter from 1884, as well as the 1958 High Seas Convention and the 1982 “constitution of the seas”, UNCLOS. In contrast, there is no corresponding regulation for the protection of digital communications infrastructure (satellites) in outer space. Although satellites used for communications services are currently not considered as efficient, reliable or cost-effective as submarine cables,⁵³ they constitute significant digital infrastructure in need of protection. On this note, three things should be observed:

First, despite not being at the center of focus in this thesis, there are a number of satellites other than communications satellites which have important functions in terms of navigation (GPS), weather forecast, research and military purposes. Satellites are not limited to providing digital communications services. Second, despite the relatively low dependency on communications satellites compared to submarine cables, satellites have shown to be an important complement to submarine cables. As recently seen in Tonga, satellites further the possibilities of smaller territories to stay online while facing the risk of a possible internet blackout due to cable failure.⁵⁴ They are also used to provide remote areas on Earth, not yet connected to submarine cables, with internet access.⁵⁵ Third, while the first transnational and transatlantic (telegraph) submarine cables were laid down in the 1850s, the first communications satellite, NASA’s *Telstar*, was not launched until over a hundred years later, in 1962.⁵⁶ The technical development of submarine cables, from their introduction to their

⁵¹ Loong Hantover. ‘The Cloud and the Deep Sea: How Cloud Storage Raises the Stakes for Undersea Cable Security and Liability’. p. 14.

⁵² Swinhoe. ‘Tonga’s international subsea cable repaired after volcanic eruption’.

⁵³ Sechrist. ‘Cyberspace in Deep Water: Protecting the Arteries of the Internet’. p. 40; Bueger, Liebetrau & Franken. *Security threats to undersea communications cables and infrastructure – consequences for the EU*. p. 13.

⁵⁴ Swinhoe. ‘Tonga’s international subsea cable repaired after volcanic eruption’.

⁵⁵ TeleGeography. ‘Submarine Cable 101’. *TeleGeography*.

<https://www2.telegeography.com/submarine-cable-faqs-frequently-asked-questions> (Gathered 2022-09-19).

⁵⁶ Space Center Houston. ‘Mission Monday: Five fast facts about Telstar, the world’s first active communications satellite’. *Space Center Houston*. 2020-07-06.

current state, has been astronomical. Over the span of approximately 170 years, cables have evolved from telegraph cables where one message could take 16 hours to cross the Atlantic, to cables transporting large amounts of information across the Globe at a speed approaching the speed of light, through fiber-optic strands not thicker than a human hair.^{57 58} With only 60 years passing since the launch of the first communications satellite, who knows what the future holds for this type of digital infrastructure, in terms of capacity, as technology evolves? Considering these aspects, the author argues that it is high time to develop an international law regime for the protection of digital infrastructure in outer space.

2.6. Threats to Digital Infrastructures at Sea and in Outer Space

Laying “unarmoured and unprotected” on the ocean floor, submarine cables are quite fragile and at constant risk of being damaged or cut.⁵⁹ Threats to submarine cables are well documented. Damage can be the result of natural phenomena such as hurricanes, cyclones, typhoons, earthquakes and tsunamis: In 2009, for example, typhoon Morakot created problems as it injured at least nine submarine cables outside Taiwan.⁶⁰ Submarine cables can also be damaged through human activity and the most common reason is *unintentional* damage: Over 50% of damage to submarine cables can be attributed to activities connected to commercial fishing and incidents related to anchoring.⁶¹ As previously exemplified, there is also a threat of *intentional* damage to digital infrastructure at sea, and the fact that tools to repress such actions have been developed in international law suggests that this phenomena is a real source of concern for the international community.

Apart from a number of external threats, there are some weaknesses in the very structure and location of digital communications infrastructure at sea. For example, some geographical areas constitute network points where cables come together and thus risk becoming significant “choke points” for data traffic in case of an attack. In such locations, an attack can injure several important cables at once, causing disruptions to a number of cable routes. Consequences become particularly serious if both primary routes and re-routing cables are

<https://spacecenter.org/mission-monday-five-fast-facts-about-telstar-the-worlds-first-active-communications-satellite/> (Gathered 2022-09-14).

⁵⁷ Steaming Into The Future. 'From Telegraph to Text: How Undersea Cables Connect Us All'. *Steaming Into The Future*. <https://shiphistory.org/2022/01/20/from-telegraph-to-text/> (Gathered 2022-09-18).

⁵⁸ TeleGeography. 'Submarine Cable 101; Paul Brodsky. 'The Speed of Light Never Changes—Except When it Does'. *TeleGeography Blog*. 2017-07-10. <https://blog.telegeography.com/the-speed-of-light-never-changes-except-when-it-does> (Gathered 2022-10-03).

⁵⁹ Sechrist. 'Cyberspace in Deep Water: Protecting the Arteries of the Internet', p. 40.

⁶⁰ Lionel Carter, Douglas Burnett, Stephen Drew, Graham Marle, Lonnie Hagadorn, Deborah Bartlett-McNeil & Nigel Irvine. *Submarine cables and the oceans: connecting the world*. UNEP-WCMC Biodiversity Series No. 31, 2009. p. 40.

⁶¹ Bueger, Liebetrau & Franken. *Security threats to undersea communications cables and infrastructure – consequences for the EU*. p. 12.

affected.⁶² Other weaknesses concern landing points and landing stations connecting submarine cables to the land territory of States. These issues fall within the national jurisdiction of States and are therefore not central for this thesis: However, it can briefly be noted that, when protecting submarine cables on land, geopolitical considerations become important. For instance, it is relevant to note whether a State housing an important landing point is an ally or not, or if landing stations are properly protected. From a geopolitical point of view it is also relevant to consider the fact that most cables are privately owned and operated, and there is a risk of insufficient information sharing regarding potential threats.⁶³

Unlike submarine cables, digital infrastructure in outer space does not face threats like anchoring incidents and tsunamis. Instead, the most noticeable threat towards satellites at the moment is so-called “space junk”. Space junk, like the name suggests, consists of debris left by humans in outer space: It is a by-product of launching objects into outer space and can, for some time, stay located in the Earth’s orbit where it poses a threat to satellites. A collision can potentially break a satellite, which was the case for a Chinese flagged satellite in 2021.⁶⁴

During the Cold War, the USSR and the U.S. competed in a “space race” which led to tremendous technological leaps within just a few years time. The USSR sent the first astronaut to outer space in 1961 and the U.S. put the first man on the Moon in 1969. Since the 1960s, hundreds of people have had the opportunity to go to outer space, but there has been no force similar to the space race triggering fast developments in this area. At the moment, only three States (China, Russia and the U.S.) have human space programmes, and space travel remains very expensive.⁶⁵ Therefore, compared to submarine cables, satellites are not easily accessible to the average citizen; Traveling to space is not something most people can manage or afford. Nonetheless, there is currently a new space race on the rise, which might make affordable space tourism a reality. Over 20 years ago, in 2001, multi millionaire Dennis Tito paid the company Space Adventures to take him to space and, in recent years, Big Tech has taken an interest in space travel. Currently, companies like Amazon (Blue Origin) and Tesla (SpaceX) are on a mission to make space travel cheaper, partaking in a “billionaires’ space race” of sorts. Tesla founder Elon Musk has expressed the goal of developing a colony on Mars, by transporting people there from Earth in giant space vessels holding up to 100 passengers at a time.⁶⁶ In fact, SpaceX appears to be making significant progress in the field. In 2018, the company launched the World’s so far most powerful operational rocket, *Falcon*

⁶² Sean O’Malley. ‘Vulnerability of South Korea’s Undersea Cable Communications Infrastructure: A Geopolitical Perspective’. *Korea Observer*. 2019, Vol. 50(3): 2019. p. 309-330. p. 319-320.

⁶³ O’Malley. ‘Vulnerability of South Korea’s Undersea Cable Communications Infrastructure: A Geopolitical Perspective’. p. 317-324.

⁶⁴ Jonathan O’Callaghan. ‘What is space junk and why is it a problem?’. *Natural History Museum*. <https://www.nhm.ac.uk/discover/what-is-space-junk-and-why-is-it-a-problem.html> (Gathered 2022-09-19).

⁶⁵ Oliver Holmes. ‘Space: how far have we gone – and where are we going?’. *The Guardian*. 2018-11-19.

<https://www.theguardian.com/science/2018/nov/19/space-how-far-have-we-gone-and-where-are-we-going> (Gathered 2022-09-17).

⁶⁶ Holmes. ‘Space: how far have we gone – and where are we going?’

Heavy, into outer space. The rocket was carrying Musk’s own “Tesla roadster”, which has since traveled between the orbits of Earth and Mars.⁶⁷ The U.S-based company also owns over a third of satellites currently in the Earth’s orbit, making it a significant actor in outer space.⁶⁸

Furthermore, there is currently a large demand for mobile broadband services. The costs of launching objects into outer space are decreasing meanwhile costs for expansion of Earth-based digital infrastructure providing telecommunications services remain high. Therefore, there are significant interests concerning the use of digital communications infrastructure in outer space, the satellite industry is growing by the day and the future seems bright for those who invest in digital communications infrastructure. Additionally, progress in facilitation of space tourism and sustainable human life in outer space indicates possibilities for companies to capitalize off enabling comfortable living beyond Earth, satisfying the demands of the future.⁶⁹ As it is currently attractive to invest in outer space, quick developments in the field are likely to occur, and with developments once again gaining momentum it is easier to picture a future where space travel is more accessible and frequent. As outer space becomes more crowded, the number of risks faced by digital infrastructure in this area will likely increase, and therefore it is necessary to develop a protective legal framework for digital communications infrastructure in outer space. Like Robert Louis Stevenson wrote in *Treasure Island* in 1883, one year before the first convention on the protection of submarine cables was drafted:

We must go on, because we can’t turn back.⁷⁰

What, then, is the solution? In law, a useful tactic in handling future challenges is often to look backwards. Once, the seas laid before humans unexploited, unexplored and unregulated. Today, there are advanced and extensive frameworks in place handling most issues connected to the World’s waters: For instance, the 1982 *United Nations Convention on the Law of the Sea* was intended to cover “all matters relating to the law of the sea”.⁷¹ The international law governing outer space consists of five treaties and a number of principles, yet remains far less intricate than maritime law. As mankind moves further on the voyage into outer space, perhaps the lessons learned through centuries of States sharing the World’s oceans can be utilized, in order to develop a legal framework for the protection of digital infrastructure in outer space? In the following chapters, this question will be analyzed in depth.

⁶⁷ Jackie Wattlers. ‘Elon Musk launched his own Tesla roadster to space four years ago. Where is it now?’. *CNN*. 2022-02-08. <https://edition.cnn.com/2022/02/08/tech/spacex-tesla-roadster-falcon-heavy-anniversary-scn/index.html>, gathered 2022-09-16).

⁶⁸ DeweSoft. ‘Every Satellite Orbiting Earth and Who Owns Them’. *DeweSoft*. 2022-01-18. <https://dewesoft.com/daq/every-satellite-orbiting-earth-and-who-owns-them> (Gathered 2022-09-16).

⁶⁹ Weinzierl et al. ‘Your Company Needs a Space Strategy. Now.’.

⁷⁰ Robert Louis Stevenson. *Treasure Island*. 1883. chapter 12.

⁷¹ **Emphasis added.** United Nations. *Resolution 3067 (XXVIII) adopted by the General Assembly*. 1973-11-16.

Chapter 3. The International Law of the Sea

Submarine cables are fragile and, on average, one breaks every three days.⁷² Breakage can be the result of natural phenomena or human intervention.⁷³ While the latter primarily takes the shape of accidental damage resulting from fishing and anchoring accidents,⁷⁴ intentional damage is also an issue of concern. If surrounding cables are injured in connection to repairs or installations of a submarine cable, the owner of the cable being repaired or installed is required to compensate for the damage.⁷⁵ In most cases, submarine cables are owned and financed by non-State actors. Due to the fragility of the structures and the costs of installations and repairs, the question of *insurance* is both interesting and relevant in relation to the ever-growing network of submarine cables. However, as insurance falls within the scope of private international law, it will not be further examined in this thesis.

Due to the great importance of this type of digital infrastructure to the international community, international law provides explicit protection for submarine cables. The relevant provisions place the responsibility of legislation and enforcement on the flag State of the “offender” ship (causing the damage), but flag States sometimes fail to take adequate action within the frame of their flag State responsibilities: In particular, this is likely to occur when a flag State keeps a registry which is extensively large in comparison to its enforcement capacity, or when it lacks the will or means to satisfy its obligations under international law. Shortcomings connected to the explicit protection for submarine cables in areas beyond national jurisdiction have been identified in legal doctrine: Some scholars suggest that the protection of submarine cables may be strengthened by resorting to interpretation of already existing rules on international cooperation, currently applied in the area of maritime security. Two debated suggestions analyzed in this chapter concerns viewing offenses resulting in damage to submarine cables in areas beyond national jurisdiction as a form of piracy or maritime terrorism, respectively.

3.1. Marine Areas Beyond National Jurisdiction

Areas beyond national jurisdiction are geographical areas not subject to the jurisdiction of any State. Currently, these areas comprise the high seas,⁷⁶ the Area,⁷⁷ some polar regions,⁷⁸

⁷² Sechrist. ‘Cyberspace in Deep Water: Protecting the Arteries of the Internet’, p. 42.

⁷³ Carter et al. *Submarine cables and the oceans: connecting the world*.

⁷⁴ These activities are connected to over 50% of accidents resulting in submarine cables being injured. Bueger, Liebetrau & Franken. *Security threats to undersea communications cables and infrastructure – consequences for the EU*. p. 12.

⁷⁵ *United Nations Convention on the Law of the Sea*. 1982. Article 114.

⁷⁶ *United Nations Convention on the Law of the Sea*. 1982. Article 89.

⁷⁷ *United Nations Convention on the Law of the Sea*. 1982. Article 1(1)(1).

⁷⁸ American Society of International Law. ‘Beyond National Jurisdiction: Polar Regions’. *American Society of International Law*. <https://www.asil.org/topics/signaturetopics/BNJ/polar> (Gathered 2022-09-09).

and outer space, including the Moon and other celestial bodies.⁷⁹ Out of these areas, there are two marine areas beyond national jurisdiction: the high seas and the Area. While internal waters, the territorial sea, the exclusive economic zone and archipelagic waters are all marine areas within national jurisdiction of States, the high seas is a maritime zone consisting of waters not subjected to national jurisdiction.⁸⁰ The Area, in its turn, comprises the sea-bed and ocean floor, as well as the subsoil thereof, on the seaward side of the continental shelf.⁸¹ The high seas and the Area are considered two separate maritime zones but in some places the high seas are superjacent waters to the Area. Therefore, States exercising freedoms on the high seas are obliged to show due regard, not only towards the activities of other States on the high seas but also to activities in the Area.⁸²

3.2. Principles Governing Marine Areas Beyond National Jurisdiction

In Roman times, the sea was considered *res communis omnium*, open for all to access, and as professor Charlotte Ku puts it: "Roman practice was effectively international law", until the fall of the Roman empire in the late 400s.⁸³ Despite being challenged, the idea of the sea as a *res communis omnium* lived on long after the end of the Roman empire: For instance, viewing the sea as something open to all was famously advocated for by Hugo Grotius in his 1609 work *Mare Liberum*, where he stated that "[t]he sea is a thing so clearly common to all, that it cannot be the property of any one save God alone".⁸⁴ In current international law, the high seas and its resources are treated according to this rationale, while the Area is not.

A comparison between the principles governing the Area and the high seas, respectively, serves as an illustrative example of inconsistency in the way areas beyond national jurisdiction are treated in international law. Despite existing under the same umbrella term, and sometimes in substantial geographical proximity, the high seas and the Area are viewed through two diametrically different lenses which can essentially be understood in terms of *res communis omnium* (open to free, common use by all) and *res communis humanitatis* (shared by all as common heritage of mankind).⁸⁵

⁷⁹ *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*. 1967. Article II.

⁸⁰ *United Nations Convention on the Law of the Sea*. 1982. Article 86.

⁸¹ *United Nations Convention on the Law of the Sea*. 1982. Article 1(1)(1).

⁸² *United Nations Convention on the Law of the Sea*. 1982. Article 87(2).

⁸³ Charlotte Ku. 'The concept of *res communis* in international law'. *History of European Ideas*. 1990. Vol. 12(14), 1990: p. 459-477. p. 460.

⁸⁴ Hugo Grotius. Ralph Van Deman Magoffin (tr). 'The Freedom of the Seas'. Original title: *Mare Liberum*, first published 1609. Quoting Placentinus: p. 38.

⁸⁵ Michael Laver. 'Public, Private and Common in Outer Space: *Res Extra Commercium* or *Res Communis Humanitatis* beyond the High Frontier?'. *Political Studies*. Vol. 34(3): 1986. p. 359-373. p. 364.; Martin Svec. 'Outer Space, an Area Recognised as *Res Communis Omnium*: Limits of National Space Mining Law'. *Space Policy*. Vol. 60: 2022. p. 2.

3.2.1. Principles Governing the Area

When new technology in the 1960s made the resources in the Area accessible to humans, discussions on how to treat the Area and its resources soared. It was indicated that, even if the Area would be considered a *res communis omnium*, open for all to exploit and explore, only a handful of States would have the financial and technological means to utilize it. It was highlighted that a possible consequence of subjecting the resources of the Area to free use would be that only a few developed States would be able to harvest the economic advantages of the newfound resources. Moreover, during the same period in time, successively more States were becoming independent from colonial rule and this fact further drew attention to potential injustices which could arise from labeling the Area *res communis omnium*.⁸⁶

Eventually, it became evident that the principles balanced to regulate the high seas – the principle of freedom on one hand and the principle of sovereignty on the other – would not suffice to ensure an equitable share of the benefits stemming from the Area. Instead, the Area and its resources were declared “common heritage of mankind”,⁸⁷ and the principle has been codified in Article 136 of the 1982 *United Nations Convention on the Law of the Sea* (UNCLOS). In consequence, activities in the Area must be carried out “for the benefit of mankind as a whole”, and economic benefits following activities in the Area shall be shared equitably.⁸⁸ Hence, while all States may enjoy the benefits of activities in the Area, the maritime zone is not open for all to exploit according to preference. Additionally, as previously mentioned, activities in the Area must be respected by States exercising high seas freedoms such as laying down submarine cables on the ocean floor.

3.2.2. Principles Governing the High Seas

Unlike the Area, the high seas are not labeled “common heritage of mankind” and the uses of the high seas do not necessarily have to serve common interests of humanity. Instead, the high seas are governed by a balance, an interplay, between two principles: The *principle of freedom* (of the high seas) and the *principle of sovereignty* (of the flag State). The principle of freedom includes the freedom of activities such as navigation, scientific research, fishing and the laying down of submarine cables and pipelines.⁸⁹ Article 87 (1) of UNCLOS provides a list of high seas freedoms but the list is not exhaustive: Instead, the limit as to which extent States may use the high seas to further their own interests is set by the obligation for States to

⁸⁶ Massimo Iovane (ed.), Fulvio M. Palombino (ed.), Daniele Amoroso (ed.) & Giovanni Zarra (ed.). *The Protection of General Interests in Contemporary International Law: A Theoretical and Empirical Inquiry*. Oxford: Oxford University Press: 2021. p. 17.; Yoshifumi Tanaka. *The International Law of the Sea*. Cambridge: Cambridge University Press, 2019. 3 ed. p. 219.

⁸⁷ Iovane, Palombino, Amoroso & Zarra. *The Protection of General Interests in Contemporary International Law: A Theoretical and Empirical Inquiry*. p. 17.; Tanaka. *The International Law of the Sea*. p. 219.

⁸⁸ *United Nations Convention on the Law of the Sea*. 1982. Article 140(1)-(2).

⁸⁹ *United Nations Convention on the Law of the Sea*. 1982. Article 87(1).

pay due regard to the rights of other States on the high seas, as well as the activities pursued in the Area.⁹⁰

The high seas are ungoverned in the sense that they are not subjected to the sovereignty or national jurisdiction of any State.⁹¹ Historically, areas beyond national jurisdiction have, like the high seas, been characterized by the absence and prohibition of territorial sovereignty.⁹² Nonetheless, in order to avoid a situation where ships would be floating in a *vacuum juris*, it is necessary to subject them to the jurisdiction of a State at all times.⁹³ In this sense, the freedom of the high seas is upheld and safeguarded by the principle of exclusive jurisdiction of the flag State, i.e. the concept of the State of registry enjoying exclusive jurisdiction over all ships flying its flag. The exclusive jurisdiction of the flag State is a principle well established in both treaty and customary international law;⁹⁴ It stretches over the vessel as well as everyone and everything on board it, no matter their nationalities, and it includes both legislative and enforcement jurisdiction.⁹⁵

All States have the right to fly their flag on the high seas, and it is up to each State to decide upon conditions for registration under its flag.⁹⁶ When a ship has been registered, and has thereby acquired nationality, it is subjected to the exclusive jurisdiction of its flag State on the high seas, where it may sail under one flag only.⁹⁷ The exclusive jurisdiction of the flag State facilitates activity on the high seas without interruption from other States and it can only be set aside in exceptional cases, when expressly provided for in UNCLOS or another international treaty.⁹⁸ In UNCLOS, there are two main exceptions: the right of hot pursuit and the right of visit.⁹⁹ Universal jurisdiction is another possible exception to the exclusive jurisdiction of the flag State in areas beyond national jurisdiction at sea.

Compared to other States, the flag State enjoys a strong stance regarding control over its flag ships, but with great power comes great responsibility: The flag State must ensure that ships flying its flag comply with national and international law, through effectively exercising its jurisdiction and control in “administrative, technical and social matters”.¹⁰⁰ This includes, *inter alia*, safety precautions such as ensuring that masters and personnel of ships possess adequate qualifications, especially regarding seamanship and navigation.¹⁰¹ The role of the flag State is a safeguard mechanism preserving the order on the high seas, and thereby

⁹⁰ *United Nations Convention on the Law of the Sea*. 1982. Article 87(2).

⁹¹ *United Nations Convention on the Law of the Sea*. 1982. Articles 86 & 89.

⁹² Ku. ‘The concept of res communis in international law’. p. 470, with reference to John Kish.

⁹³ Proshanto K. Mukherjee & Mark Brownrigg. *Farthing on International Shipping*. 4 ed. Springer-Verlag Berlin Heidelberg, 2013. p. 199.

⁹⁴ Tanaka. *The International Law of the Sea*. p. 189.

⁹⁵ The M/V Saiga (No.2) case (Saint Vincent and the Grenadines v Guinea), ITLOS Judgment 1999, p. 48 para 106; Yoshifumi Tanaka. *The International Law of the Sea*. p. 189.

⁹⁶ *United Nations Convention on the Law of the Sea*. 1982. Articles 90 & 91(1).

⁹⁷ *United Nations Convention on the Law of the Sea*. 1982. Article 92(1).

⁹⁸ *United Nations Convention on the Law of the Sea*. 1982. Article 92(1).

⁹⁹ *United Nations Convention on the Law of the Sea*. 1982. Articles 110 & 111.

¹⁰⁰ *United Nations Convention on the Law of the Sea*. 1982. Article 94.

¹⁰¹ *United Nations Convention on the Law of the Sea*. 1982. Article 94(4)(b).

allowing free uses of the waters.¹⁰² Due to the importance of effective flag State jurisdiction for upholding law and order in areas beyond national jurisdiction, States overlooking their flag State responsibilities under international law can become an issue of serious concern.¹⁰³

3.3. Legal Protection of Infrastructure in Areas Beyond National Jurisdiction

Transmitting a great majority of the World's digital communications, submarine cables are of great importance to the international community and constitute critical digital infrastructure. Under the auspices of the freedom of the high seas, all States may lay down submarine cables under the high seas, provided that they show due regard towards each other's high seas freedoms, for instance by not harming cables already in place, and respect activities in the Area.¹⁰⁴ Consequently, a large network of cables, currently consisting of over 400 submarine cables worldwide, has been constructed under the seas.¹⁰⁵

Submarine cables are fragile: On average, one cable breaks every three days and cables are constantly at risk of being harmed by both incidental and intentional damaging acts.¹⁰⁶ In its 1950 yearbook, the International Law Commission describes injury to submarine cables as a crime "against the law of nations", alongside e.g. piracy and trafficking in women and children. Crimes which affect the international community, the Commission clarifies, "should be subject to international jurisdiction".¹⁰⁷ Currently, there are three central international treaties governing the protection of submarine cables: The 1884 *Convention for the Protection of Submarine Telegraph Cables*, the 1958 *Geneva Convention on the High Seas* and the 1982 *United Nations Convention on the Law of the Sea*. All three conventions are currently in force and while they all, to some extent, aim to protect submarine cables from being injured in areas beyond national jurisdiction, their overall reach and scope differ. The 1884 "Paris Convention" is a specific convention focusing on the issue of submarine cables only and, while accompanied by the other 1958 Geneva Conventions, the "High Seas Convention" covers only one maritime zone. UNCLOS, in its turn, is a very extensive treaty which is sometimes referred to as the "constitution of the oceans". It is designed to cover most areas of the international law of the sea and has incorporated much of the High Seas Convention and other sources of international maritime law. Currently, there are only 36 Parties to the Paris Convention,¹⁰⁸ while there are 63 Parties to the High Seas Convention and

¹⁰² **Compare:** International Law Commission. 'Report of the International Law Commission on the Work of its Eighth Session'. *Official Records of the General Assembly*. 4 July 1956. p. 278, comment 5 to Article 27.

¹⁰³ This is further explained in the following, see 3.4.

¹⁰⁴ *United Nations Convention on the Law of the Sea*. 1982. Articles 87(1)(c) & 112. *Convention on the High Seas* Done at Geneva. 1958. Articles 2(3) & 26(1).

¹⁰⁵ Bueger, Liebetrau & Franken. *Security threats to undersea communications cables and infrastructure – consequences for the EU*. p. 12.

¹⁰⁶ Sechrist. 'Cyberspace in Deep Water: Protecting the Arteries of the Internet'. p. 42.

¹⁰⁷ International Law Commission. *Yearbook of the International Law Commission 1950 Volume II*. New York: United Nations: 1957. p. 13, paras 95 & 97.

¹⁰⁸ Overheid. 'International Convention on the Protection of Submarine Cables, with additional Article: Treaty Data'.

168 to UNCLOS.¹⁰⁹ Which States are Parties to the conventions also differ: The U.S., for instance, is Party to the Paris Convention and the High Seas Convention but not to UNCLOS.

3.3.1. The 1884 *Convention for the Protection of Submarine Telegraph Cables*

The 1884 *Convention for the Protection of Submarine Telegraph Cables* (the Paris Convention), is a multilateral treaty applicable outside the territorial waters of its State Parties, in peacetime.¹¹⁰ Accordingly, it is applicable to submarine telecommunications cables laid down in areas beyond national jurisdiction, for instance under the high seas. There are currently 36 State Parties to the Paris convention, including the U.S. but also Yugoslavia.¹¹¹ The Paris Convention was the first international treaty concerning the protection of submarine cables and is still in force.¹¹² It has inspired subsequent international law and several of its provisions have been integrated into UNCLOS and the High Seas Convention.

The Paris Convention includes provisions on expected precautions and allocation of responsibility during installations and repairs of submarine cables. Importantly, it also addresses crime targeting submarine telecommunications cables: It specifically refers to “submarine telegraph cables”, which were the type cables used at the time of its formulation. The Convention stipulates that it is a punishable offense to “break or injure” submarine cables, “wilfully or by culpable negligence”,¹¹³ “in such manner as might interrupt or obstruct telegraphic communication, either wholly or partially”, save in special cases where such damage is necessary to save lives or to save a ship.¹¹⁴

As a point of departure, the Paris Convention assigns jurisdictional responsibility to the flag State. If a person commits the offense of breaking or injuring a submarine cable, willfully or by culpable negligence, the competent court is the court of the flag State to which the offender vessel “belongs”.¹¹⁵ The eventual incapacity of the flag State to take responsibility is also taken into consideration and, hence, the treaty includes an exceptional rule whereby jurisdiction can be claimed on the basis of the offender’s nationality.¹¹⁶ Moreover, the Paris Convention provides a right of visit on the high seas, whenever there is reason to believe that

¹⁰⁹ United Nations. ‘2. Convention on the High Seas: Geneva, 29 April 1958’. *United Nations*. https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXI-2&chapter=21 (Gathered 2022-09-13); United Nations. ‘6. United Nations Convention on the Law of the Sea: Montego Bay, 10 December 1982’.

https://treaties.un.org/pages/ViewDetailsIII.aspx?src=TREATY&mtdsg_no=XXI-6&chapter=21&Temp=mtdsg3&clang=en (Gathered 2022-09-13).

¹¹⁰ *Convention for the Protection of Submarine Telegraph Cables*. 1884. Articles I & XV.

¹¹¹ Overheid. ‘International Convention on the Protection of Submarine Cables, with additional Article: Treaty Data’. *Overheid*. <https://verdragenbank.overheid.nl/en/Verdrag/Details/001885> (Gathered 2022-09-13).

¹¹² Ekaterina Anyanova. ‘Oceans apart: overview of the international law regime for submarine cables’. *International Journal of Private Law*. Vol. 4(1): 2011. p. 100-110. p. 100.

¹¹³ **Original (British) spelling.**

¹¹⁴ *Convention for the Protection of Submarine Telegraph Cables*. 1884. Article II para 1.

¹¹⁵ *Convention for the Protection of Submarine Telegraph Cables*. 1884. Article VIII para 1.

¹¹⁶ *Convention for the Protection of Submarine Telegraph Cables*. 1884. Article VIII para 2.

an offense contrary to the Convention has been committed.¹¹⁷ The right of visit, which is enshrined in Article X of the Convention, has only been used once, in 1959. In that case, a U.S. flagged warship investigated the breakage of a submarine cable on the high seas and chose to board a Soviet fishing vessel suspected to have caused the damage. After boarding, however, the U.S. did not call for trial and punishment but instead made clear its expectations of Soviet trawlers not to injure submarine cables on the high seas going forward.¹¹⁸

3.3.2. The 1958 *Geneva Convention on the High Seas*

The 1958 *Geneva Convention on the High Seas* (the High Seas Convention) introduced a right for States to lay down submarine cables beneath the high seas.¹¹⁹ Such a right was not present in the Paris Convention.

Inspired by Article II of the Paris Convention, the High Seas Convention stipulates as a main rule that “necessary legislative measures” shall be taken in order to classify the action of breaking or injuring a submarine cable located beneath the high seas, “in such a manner as to be liable to interrupt or obstruct telegraphic or telephonic communications”, willfully or through culpable negligence, a punishable offense.¹²⁰ Like the Paris Convention, the High Seas Convention assigns the flag State the responsibility of taking such measures. The flag State bears the responsibility to react to actions connected to ships and persons under its jurisdiction. As in the Paris Convention, the provision exempts certain situations where necessary precautions have been taken in order to facilitate a legitimate purpose.¹²¹

Moreover, the High Seas Convention clarifies that owners of submarine cables who are engaged in installing or repairing submarine cables under the high seas, are economically responsible for compensating for repairs following damage they have caused to other cables when carrying out these tasks. It is the flag State’s responsibility to clarify this order in legislation.¹²² A similar provision can be found in Article IV of the Paris Convention.

3.3.3. The 1982 *United Nations Convention on the Law of the Sea*

Like the High Seas Convention, the 1982 *United Nations Convention on the Law of the Sea* (UNCLOS) clearly takes inspiration from the Paris Convention. The International Law Commission describes the protection therein as “substantially the same” but adds that UNCLOS covers a greater number of structures than its foregoers: Apart from submarine

¹¹⁷ *Convention for the Protection of Submarine Telegraph Cables*. 1884. Article X.

¹¹⁸ Guilfoyle, Paige & McLaughlin. ‘THE FINAL FRONTIER OF CYBERSPACE: THE SEABED BEYOND NATIONAL JURISDICTION AND THE PROTECTION OF SUBMARINE CABLES’. p. 663.; Anyanova. ‘Oceans apart: overview of the international law regime for submarine cables’. p. 104.

¹¹⁹ *Convention on the High Seas* Done at Geneva. 1958. Articles 2(3) & 26(1).

¹²⁰ *Convention on the High Seas* Done at Geneva. 1958. Article 27.

¹²¹ *Convention on the High Seas* Done at Geneva. 1958. Article 27.

¹²² *Convention on the High Seas* Done at Geneva. 1958. Article 28.

telecommunications cables, it includes pipelines and high voltage cables.¹²³ The protection of submarine cables in UNCLOS has been described as “widely considered customary international law”.¹²⁴

Article 113 of the Convention is almost identical to Article 27 of the High Seas Convention, as UNCLOS addresses the flag State with the responsibility of taking necessary measures in making damage to submarine cables, willfully or by culpable negligence, a punishable offense. However, Article 113 reaches further than the High Seas Convention, as it expands the scope of the protection to encompass “conduct *calculated* or *likely to result* in such breaking or injury” of a submarine cable beneath the high seas.¹²⁵ Regarding the responsibility following a cable injury caused while laying down or repairing another cable, Article 114 of UNCLOS provides a rule identical to Article 28 of the High Seas Convention.

3.3.4. Comparing Regulations: Flag State Responsibility and the Right of Visit

All three of the above mentioned conventions expressly put the legislative responsibility on the flag State. There is no explicit mention of enforcement jurisdiction in e.g. Article 113 UNCLOS but, considering the role of the flag State on the high seas, it is likely safe to assume that also this responsibility rests exclusively with the State of registry. With regard to enforcement by other States than the flag State, only the Paris Convention stipulates a right of visit.¹²⁶

The right of visit, as provided for in Article 110 UNCLOS, can become relevant when there is a warship and a non-warship of different registries involved, and there is “reasonable ground” for suspecting the non-warship’s engagement in piracy, slave trade or unauthorized broadcasting, or that the ship has no nationality, flies a foreign flag or refuses to show its flag.¹²⁷ This is clearly different from the right of visit stipulated by the Paris Convention, which rather concerns situations where a foreign-flagged ship is suspected to be responsible for causing damage to submarine communications cables. Relevantly, while the right of visit in UNCLOS does not include crimes targeting submarine cables, it does not exclude the possibility of visiting on the basis of the Paris Convention. As the Paris Convention is an international treaty expressly providing this right,¹²⁸ Article X of may be applied as an exception to the exclusive jurisdiction of the flag State provided, of course, that both flag States involved are Parties to the Convention. In this context, it should be noted that not many States are Parties to the Paris Convention, and recalled that the right of visit enshrined therein has rarely been utilized. This suggests that it might not be a very useful provision in practice.

¹²³ International Law Commission. ‘Report of the International Law Commission on the Work of its Eighth Session’. *Official Records of the General Assembly*. 4 July 1956. p. 294, comment to Article 62.

¹²⁴ Zoe Scanlon. ‘Addressing the Pitfalls of Exclusive Flag State Jurisdiction: Improving the Legal Regime for the Protection of Submarine Cables’. *Journal of Maritime Law and Commerce*. Vol. 48(3): 2017. p. 295-340. p. 298.

¹²⁵ **Emphasis added.** *United Nations Convention on the Law of the Sea*. 1982. Article 113.

¹²⁶ *Convention for the Protection of Submarine Telegraph Cables*. 1884. Article X.

¹²⁷ *United Nations Convention on the Law of the Sea*. 1982. Article 110(1).

¹²⁸ Compare the *United Nations Convention on the Law of the Sea*. 1982. Article 92(1).

Keeping in mind the role of the flag State on the high seas, it is hardly surprising that conventions providing protection for submarine cables in areas beyond national jurisdiction assign the jurisdictional responsibility to the flag State. Nonetheless, the system of exclusive flag State jurisdiction is not waterproof. The effectiveness of flag State control in areas beyond national jurisdiction can be challenged by, for example, failure by the State to implement legislation, or practical difficulties concerning enforcement. Disadvantages of exclusive flag State jurisdiction become especially palpable when the flag State lacks the capacity or interest to make adequate efforts in order to meet the expectations of it as a flag State. Insufficient flag State action is an issue of concern in relation to "flags of convenience".

3.4. Flags of Convenience

Ships of all States are free to navigate the high seas. While there is a right for all States to determine the conditions for ship registry, the right is not absolute: There is also a standing requirement for a *genuine link* between State and ship.¹²⁹ According to the International Tribunal of the Law of the Sea (ITLOS), the purpose of the genuine link is to ensure effective implementations of the duties of the flag State.¹³⁰ However, despite the wording being included in both UNCLOS and the High Seas Convention, the exact meaning of the notion "genuine link" remains unclear in the international law of the sea.¹³¹ Even so, the importance assigned to the genuine link in the context of ship registry can be used to categorize registries: "Closed registry" States, for instance, have traditionally used the nationality of the shipowner to determine the existence of a genuine link. Historically, the nationality of the crew or key personnel, as well as where the ship was built, have also been considered connecting factors.¹³² How "tight" the link is required to be depends on the State of registry but, generally, closed registry States require a strong genuine link compared to alternative forms of registry.¹³³

On the other end of the spectrum are "open registries", which are normally satisfied with a weak genuine link, if any.¹³⁴ Examples of such States are Panama and Liberia, which have registered a large number of foreign-owned ships under their flags. As requirements for registration vary between States, there is no all-encompassing definition covering all open registries. Notably, however, these States tend to be resorted to by companies seeking to operate at lower costs, or to be subjected to certain rules (or lack thereof), in order to be able to compete more efficiently.¹³⁵ Historically, open registry States have become safe havens for

¹²⁹ *United Nations Convention on the Law of the Sea*. 1982. Article 91(1).

¹³⁰ Tanaka. *The International Law of the Sea*. p. 194.

¹³¹ K X Li and J Wonham. 'New Developments in Ship Registration'. *International Journal of Marine and Coastal Law*. Vol. 14(1): 1999. p. 137-154. p. 137-138.

¹³² Mukherjee & Brownrigg. *Farthing on International Shipping*. p. 200.

¹³³ Mukherjee & Brownrigg. *Farthing on International Shipping*. p. 204.

¹³⁴ K X Li and J Wonham. 'New Developments in Ship Registration'. p. 137-154. p. 139.; Mukherjee & Brownrigg. *Farthing on International Shipping*. p. 206.

¹³⁵ Mukherjee & Brownrigg. *Farthing on International Shipping*. p. 207-208.

ship owners striving to escape responsibility and to reduce costs. For this reason, open registry States are sometimes referred to as “flags of convenience” (FOC).

Due to the possibility of collecting registration fees and annual fees from ship owners in their registry, FOC States have a financial interest in expanding their registries. As the threshold for entering an open registry is generally low, FOC registries can grow large even when the flag State itself is small. For example, Panama is a small open registry State with a population of only 4,3 Million but has had the World’s largest register since 1993.¹³⁶ ¹³⁷ This situation has sparked concerns regarding the effectiveness of FOC State enforcement under their flag State responsibility. It has been questioned to what extent FOC States have the means and the will to adequately exercise their jurisdictional powers as flag States, for example in matters of maritime safety and security.¹³⁸ The protection of submarine cables, which depends heavily on flag State engagement in legislation and enforcement, is significantly weakened when flag States do not intend to make use of their exclusive jurisdiction on the matter. Moreover, when a flag State lacks the will or capacity to satisfy its responsibilities under international law, the exclusive jurisdiction of the flag State – which is intended to guarantee free use of the high seas – risks becoming an obstacle to holding saboteurs covered by certain flag State jurisdictions responsible for offenses targeting submarine cables.

3.5. Critique Against the Current Order for Protection of Digital Infrastructure

Because the exclusive sovereignty of the flag State is a way of upholding the freedom of the high seas, it is critical that it is effective. Unfortunately, the efficiency of implementation and enforcement by flag States, regarding the protection of submarine cables beyond national jurisdiction, is in some aspects insufficient. While flags of convenience might add to the problem, lacking efficiency in flag State jurisdiction appears to be a wider issue.

Even though States have a clear legislative responsibility to make the targeted actions an offense punishable by law, implementation is lacking. Many States have failed to implement such legislation at all, and it is not uncommon that legislation actually in place is outdated and that penalties are too low to be effective. In some cases, there are rules fit to target offenses caused through culpable negligence but not offenses committed with intent.¹³⁹ In this sense, despite the international law on the matter currently in place, there is arguably a legal gap in the protection of submarine cables beyond national jurisdiction.

¹³⁶ Landguiden. ‘Panama’. *Landguiden*.

<https://www.ui.se/landguiden/lander-och-omraden/nordamerika/panama/> (Gathered 2022-09-14).

¹³⁷ Panama Maritime Authority. ‘Leading bulk carriers sector’. *República de Panamá*.

<https://mire.gob.pa/ministerio/the-panama-ship-registry-is-the-largest-in-the-world-since-1993-22-of-the-world-market-share/> (Gathered 2022-09-14).

¹³⁸ Walton J McLeod. ‘The Flags-of-Convenience Problem’. *South Carolina Law Review*. Vol. 16(3): 1964. p. 409-418. p. 413.

¹³⁹ Scanlon. ‘Addressing the Pitfalls of Exclusive Flag State Jurisdiction: Improving the Legal Regime for the Protection of Submarine Cables’. p. 299-300.

Furthermore, even when there is applicable law in place, the flag State might not be in the position to ensure compliance by ships in its registry and persons under its jurisdiction. If there is an encounter on the high seas between a warship and a merchant ship flying different flags, and the flag States are not both Parties to the Paris Convention, there is no explicit right for the warship to visit the merchant ship on the grounds of suspecting engagement in activity causing damage to submarine cables under the high seas. If the ships were flying the same flag, exclusive enforcement jurisdiction of the flag State would enable the warship to act on such suspicions. However, it is not likely that a situation would arise where an offender is caught red handed committing such crimes, by a warship coincidentally belonging to the same register. Realistically, enforcement would often have to wait until the offending ship appears within the jurisdiction of its flag State,¹⁴⁰ and if the flag State requires a weak, or no, genuine link, returning to the flag State might be a rare occurrence for the ship. This creates a weakness in enforcement efficiency.

3.6. Possible Solutions to Ineffective Flag State Jurisdiction

In some areas of the international law of the sea, the exclusive jurisdiction of the flag State has been considered insufficient. When one State cannot by itself handle an issue, the solution is generally to seek cooperation between States, in one way or another. A strategy in maritime law, with regard to both fishing and ship safety, has been to introduce a forum for cooperation (such as RFMOs for fishing and IACS for classification of ships), provide guidelines for flag States and empower port States to make controls. The latter possibility has shown to be especially valuable in cases where ships seldom, if ever, return to the ports of their flag State: for example in cases of flags of convenience. With regard to submarine cable protection, an organization, the International Cable Protection Committee (ICPC), has taken on the task of providing “leadership, knowledge and guidance on issues related to submarine cable security and reliability”. At present, the ICPC represents 97% of submarine telecommunications cables worldwide and aims, *inter alia*, to raise awareness about submarine cables and provides guidelines and recommendations on maintenance and protection of submarine cables.¹⁴¹

In international law, cooperation can also take the shape of introduction of shared, or even *universal*, jurisdiction. This is the case for a number of heinous crimes and, with regard to maritime security, piracy is a classic example. Certain crimes endangering navigation have also resulted in expansion of jurisdiction beyond the exclusive jurisdiction of the flag State, in areas beyond national jurisdiction. In the international law of the sea, certain offenses which constitute threats to navigation are considered acts of terrorism. Conventions targeting terrorism tend to put the center of gravity on cooperation in order to ensure effective results

¹⁴⁰ Guilfoyle, Paige & McLaughlin. 'THE FINAL FRONTIER OF CYBERSPACE: THE SEABED BEYOND NATIONAL JURISDICTION AND THE PROTECTION OF SUBMARINE CABLES'. p. 663-664.

¹⁴¹ ICPC. 'About the ICPC'. ICPC. Updated 2022-09-13. <https://www.iscpc.org/about-the-icpc/> (Gathered 2022-09-21).

and, conformingly, maritime law offers States the opportunity to work together to solve such issues of common interest.¹⁴²

International law is not static, it follows the needs of the international community. Hence, when new problems arise, international law must evolve to address them. It has been argued that, as it has now “become clear that where the exclusive flag State jurisdiction framework is not adequate, international law must evolve to address new realities of the international context”.¹⁴³ In consequence, some scholars have suggested that parts of the current international law of the sea, facilitating inter-State cooperation, can be utilized to strengthen the protection of submarine cables.

One of the suggested solutions is to use the “piracy analogy”, that is: an attempt to fit other crimes, a historical example is slave trade, under the concept of piracy.¹⁴⁴ The premise for such a solution is that the offense falls within the scope of piracy as it is defined in Article 101 of UNCLOS. Another suggested solution is to treat offenses targeting submarine cables like a form of maritime terrorism. Generally, anti-terrorist conventions are directed at terrorism taking a specific shape, for example nuclear terrorism or terrorism by bombing.¹⁴⁵ There are several international treaties on the topic of terrorism, none of which specifically targets submarine cables: However, for maritime terrorism in general, the 1988 *Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation* (SUA Convention) and its protocols are of central importance. As the scope of the 1988 SUA Convention is limited to hijacking and crimes imposing risks for *navigation*,¹⁴⁶ and its additional 1988 *Protocol for the Suppression of Unlawful Acts against the Safety of Fixed Platforms Located on the Continental Shelf* mainly aims to protect structures used by the oil industry,¹⁴⁷ the most relevant provisions are enshrined in the 2005 *Protocol to the Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation*.

¹⁴² Scanlon. ‘Addressing the Pitfalls of Exclusive Flag State Jurisdiction: Improving the Legal Regime for the Protection of Submarine Cables’. p. 310.

¹⁴³ Scanlon. ‘Addressing the Pitfalls of Exclusive Flag State Jurisdiction: Improving the Legal Regime for the Protection of Submarine Cables’. p. 304.

¹⁴⁴ Xuexia Liao. ‘Protection of Submarine Cables against Acts of Terrorism’. *Ocean Yearbook*. Vol. 33: 2019. p. 456–486.p. 471; Louis Sicking. ‘God’s Friend, the Whole World’s Enemy: Reconsidering the Role of Piracy in the Development of Universal Jurisdiction’. *Netherlands Journal of Legal Philosophy*. Vol. 47(2): 2018. p. 176-186. p. 184.

¹⁴⁵ Organization for Security and Co-operation in Europe. ‘Status of the Universal Anti-Terrorism Conventions and Protocols as well as other International and Regional Legal Instruments related to Terrorism and Co-operation in Criminal Matters in the OSCE Area’. *Organization for Security and Co-operation in Europe*. 2018-01. p. 4.

¹⁴⁶ *Convention for the Suppression of Unlawful Acts Against the Safety of Maritime Navigation*. 1988. Article 3.

¹⁴⁷ *1988 Protocol for the Suppression of Unlawful Acts against the Safety of Fixed Platforms Located on the Continental Shelf*. 1988. para 1.

3.7. Analysis of the Two Main Suggestions Regarding Strengthened Protection

In the following, the two suggestions presented in legal doctrine, concerning interpretation of current international maritime law on piracy and terrorism in order to strengthen the protection for submarine cables in areas beyond national jurisdiction, are analyzed in detail. It should be noted that the main purpose of the analysis is not to determine if the relevant provisions are currently applicable to the act of injuring submarine cables, but rather to investigate which elements make those provisions interesting in terms of protecting digital infrastructures in areas beyond national jurisdiction. This understanding is relevant to the *de lege ferenda* analysis in *Chapter 4*.

The central questions in the following analysis are threefold: First, what is the *raison d'être* of the provisions? Why is there a need for legislation governing international cooperation on the repression of terrorism and piracy, respectively? Second, what is the scope of the provisions? What is included and excluded, and which considerations have determined the scope? Third, what are the practical functions of the relevant regimes? Presuming it is possible, how does the application of these provisions strengthen the protection of submarine cables in areas beyond national jurisdiction?

3.7.1. Why Is There a Need for Rules on Piracy in International Maritime Law?

UNCLOS, the "constitution of the oceans", is a framework aiming to regulate all issues concerning the international law of the sea. The treaty is built on principles of mutual understanding and cooperation, keeping in mind the interests of States to protect their sovereignty. A central aim of UNCLOS is to maintain and strengthen "peace, security, cooperation and friendly relations among all nations".¹⁴⁸ Arguably, providing tools for State cooperation on the repression of piracy in areas beyond national jurisdiction, fits this purpose.

Piracy in all its facets is as old as seafaring and seafaring
itself as a profession is arguably as old as human civilisation¹⁴⁹

Today, it is considered a common interest of the international community to repress acts of piracy in areas beyond national jurisdiction, but this has not always been the case. Historically, the view on piracy has not been consistent. In Roman times, philosopher Cicero constructed what has come to be known as the "Cicero paradigm". He argued that, because pirates are not enemies to one State in particular, they must be enemies of *all*. In medieval times, Italian professor of law, Bartolus, argued in a similar manner but reworded the phrase "enemy of all" to *hostis humanis generis*, "enemy of mankind".¹⁵⁰

Despite the Cicero perspective being represented, piracy was not considered a criminal offense in Europe until the end of the middle ages, when it was criminalized as part of a

¹⁴⁸ *United Nations Convention on the Law of the Sea*. 1982. Preamble.

¹⁴⁹ Mukherjee & Brownrigg. *Farthing on International Shipping*. p. 251.

¹⁵⁰ Sicking. 'God's Friend, the Whole World's Enemy: Reconsidering the Role of Piracy in the Development of Universal Jurisdiction'. p. 176-177.

larger criminal law reform. In 14th century Europe, piracy was not considered an especially heinous crime: In fact, the denotation “pirate” (“pirata”, “piratica”) in both English and French had a neutral meaning until the 1350s, and violence was so closely connected to regular maritime trade that piracy was considered the norm.¹⁵¹ Preceding the criminalization, there was a shift in the view on piracy: Pirates were no longer considered “simple sea robbers” targeting merchandise, but rather threats to the authority of the monarch.¹⁵² Hence, the criminalization can be understood as a result of both the Cicero paradigm – the idea that pirates are enemies of all of mankind – and the Augustine paradigm, which states that pirates are *enemies*, including enemies to their own community. Consequently, the pirate label was not exclusive to robbers at sea, but also included political opponents, etcetera.

Since the return of the idea of pirates constituting a common threat to the international community, this has been the general view on the matter. As a result, rules on its repression have been codified in the High Seas Convention and in UNCLOS. In a comment on the Draft Articles presented in its 1956 yearbook, the International Law Commission states that “[a]ny State having an opportunity of taking measures against piracy, and neglecting to do so, would be failing in a duty laid upon it by international law”.¹⁵³

In sum, acts of piracy have been viewed differently over the course of history: While pirates have been considered enemies – be it of the head of State, of their community or of mankind as a whole – piracy has also been considered normal and not as something particularly gruesome. The present day legislation rests upon the Roman idea that piracy is a threat to the international community as a whole, because it is not a threat to any State in particular. In line with the strive for international cooperation, peace and security guiding UNCLOS, the provisions on repression of piracy in current international maritime law enables States to work jointly in dealing with this shared burden and threat.

3.7.2. Why Is There a Need for Rules on Terrorism in International Maritime Law?

Compared to piracy, maritime terrorism is quite a recent concept. It is generally agreed that the first incident of maritime terrorism in the modern era occurred in 1961, through the hijacking of the “Santa Maria”.¹⁵⁴ In the area of international maritime security, treaties are often reactive rather than proactive, but despite this incident it was not until the 1980s that a convention targeting maritime terrorism, the 1988 SUA Convention, was drafted.

In 1985, a group associated with the Palestinian Liberation Front hijacked an Italian cruise ship, “Achille Lauro”, while it was docked in Egypt. The hijackers took hostages, used the situation to put pressure on Israel to release Palestinian prisoners and killed an American

¹⁵¹ Sicking. ‘God’s Friend, the Whole World’s Enemy: Reconsidering the Role of Piracy in the Development of Universal Jurisdiction’. p. 179-180.

¹⁵² Sicking. ‘God’s Friend, the Whole World’s Enemy: Reconsidering the Role of Piracy in the Development of Universal Jurisdiction’. p. 180-181.

¹⁵³ International Law Commission. *Yearbook of the International Law Commission 1956 Volume II*. New York: United Nations: 1957. p. 282. Article 38, comment 2.

¹⁵⁴ Mukherjee & Brownrigg. *Farthing on International Shipping*. p. 254-255.

citizen on board the ship.¹⁵⁵ Because there was only one ship involved, the hijacking of Achille Lauro did not meet the two-ship requirement in Article 101 UNCLOS and therefore failed to qualify as piracy.¹⁵⁶ As maritime terrorism had previously not been considered a significant problem, no rules fit to handle such situations had been put in place.¹⁵⁷ Following the Achille Lauro incident, the international community recognized a need to extend international law concerning crimes at sea beyond the scope of piracy and, thus, the 1988 SUA Convention was developed. The 1988 Convention was later amended by the 2005 SUA Protocol, which is said to have been created as a reaction to the terrorist attacks in New York on the 11th of September 2001.¹⁵⁸ Indeed, this event drew the eyes of the international community to the threat of terrorism and, on the day following the attacks, then U.S. President George W. Bush declared a global war on terror holding that:

The attack took place on American soil, but it was an attack on the heart and soul of the civilized world. And the world has come together to fight a new and different war, the first, and we hope the only one, of the 21st century. A war against all those who seek to export terror, and a war against those governments that support or shelter them.¹⁵⁹

In line with how Bush described terrorism as an attack not only on the U.S. but also on the civilized World as a whole, the Preamble of the 2005 SUA Protocol describes terrorism as a threat to international peace and security. It also refers to a number of international resolutions condemning terrorism in all shapes and forms and encourages inter-State cooperation on the repression of such acts.

Although the 9/11 attacks are often described as the main factor fueling the development of the 2005 SUA Protocol, it is not the only occurrence of terrorism in the beginning of the 21st century. In the early 2000s, terrorism at sea took the shape of so-called “suicide boats”, boats used as weapons. In the year of 2000, explosives loaded on a suicide boat were detonated after the vessel had approached the U.S. government vessel “USS Cole”, 17 people died and nearly 40 were injured.¹⁶⁰ In 2002, a French oil tanker was targeted and bombed by a smaller vessel, which resulted in oil spill from the ship, a fire lasting 36 hours and the death of one crew member.¹⁶¹ In 2004, a bomb exploded on board the “M/V Superferry 14”, causing a fire and resulting in 116 people losing their lives.¹⁶²

¹⁵⁵ Richard Pallardy. 'Achille Lauro hijacking'. *Britannica*.

<https://www.britannica.com/event/Achille-Lauro-hijacking> (Gathered 2022-09-16).

¹⁵⁶ Barry Hart Dubner & Karen Greene. 'On the Creation of a New Legal Regime to Try Sea Pirates'. *Journal of Maritime Law and Commerce*. Vol. 41(3): 2010-07. p. 439-464. p. 460.

¹⁵⁷ Scott D. MacDonald. 'The SUA 2005 Protocol: A Critical Reflection'. *International Journal of Marine and Coastal Law*. Vol. 28(3): 2013. p. 485-516. p. 486.

¹⁵⁸ MacDonald. 'The SUA 2005 Protocol: A Critical Reflection'. p. 485-486

¹⁵⁹ U.S. Department of State Archive. 'The Global War on Terrorism: The First 100 Days'. *U.S. Department of State*. <https://2001-2009.state.gov/s/ct/rls/wh/6947.htm> (Gathered 2022-09-28).

¹⁶⁰ FBI. 'USS Cole Bombing'. *FBI*. <https://www.fbi.gov/history/famous-cases/uss-cole-bombing> (Gathered 2022-09-28).

¹⁶¹ Cedre. 'Limburg'. *Cedre*. 2004-05-02. <http://www.cedre.fr/en/Resources/Spills/Spills/Limburg> (Gathered 2022-09-28); Mukherjee & Brownrigg. *Farthing on International Shipping*. p. 256.

¹⁶² Safety4Sea Editorial Team. 'Superferry14: The world's deadliest terrorist attack at sea'. *Safety4Sea*. 2019-02-27.

In sum, customary and conventional rules on maritime terrorism do not date back as far as rules on piracy. In contrast to piracy, however, there does not seem to be anything suggesting that terrorism has historically been considered tolerable: The occurrence of terrorist acts has rather resulted in the development of international legislation on maritime security condemning terrorism in different forms and encouraging States to cooperate on its repression. Like piracy, terrorism is viewed as a common threat to the international community and therefore cooperation is necessary in order to effectively combat the phenomena.

3.7.3. Piracy: Comments on the Scope of Article 101 UNCLOS

UNCLOS provides a quite narrow definition of piracy. Piracy is defined in Article 101 as “any illegal acts of violence or detention, or any act of depredation, committed for private ends by the crew or the passengers of a private ship or a private aircraft” which is directed towards another ship or aircraft on the high seas, including “persons or property on board such ship or aircraft”,¹⁶³ or “against a ship, aircraft, persons or property in a place outside the jurisdiction of any State”.¹⁶⁴ The UNCLOS definition of piracy, which incorporates the corresponding provision in the High Seas Convention in its entirety, is one of the most widely accepted definitions and likely reflects customary international law.¹⁶⁵

Any Illegal Acts of Violence or Detention or Any Acts of Depredation

According to Article 101, the scope of piracy includes illegal acts of violence or detention and any acts of depredation. Based on the ordinary meaning of the words, as they are defined in the dictionary, this includes acts of physical force used to “injure, abuse, damage or destroy”, acts of holding back or not releasing someone or something, and acts of plundering: to take something wrongfully or by force.¹⁶⁶ Overall, the actions mentioned do not appear particularly ambiguous or unclear. Judging from the ordinary meaning of the words, destruction or theft of submarine cables is likely covered, provided that the other prerequisites are met. In doctrine, it has been noted that the term “illegal” is somewhat unclear in this context. In absence of any further clarifications on the meaning, it appears to be up to national courts to determine whether the actions at hand are illegal under international law or not.¹⁶⁷ Considering the fact that there are currently three multilateral

<https://safety4sea.com/cm-superferry14-the-worlds-deadliest-terrorist-attack-at-sea/> (Gathered 2022-09-28).

¹⁶³ *United Nations Convention on the Law of the Sea*. 1982. Article 101(a)(i).

¹⁶⁴ *United Nations Convention on the Law of the Sea*. 1982. Article 101(a)(ii).

¹⁶⁵ Musili Wambua. 'A critical review of the global legal framework on piracy: 40 years after UNCLOS'. *Journal of the National Maritime Foundation of India*.. 2022. p. 134-148. p. 136.; Liao. 'Protection of Submarine Cables against Acts of Terrorism'. p. 472-473.

¹⁶⁶ Merriam Webster. 'Definition of *violence*'. <https://www.merriam-webster.com/dictionary/violence>; 'Definition of *detention*', <https://www.merriam-webster.com/dictionary/detention>; 'Definition of *depradate*', <https://www.merriam-webster.com/dictionary/depredation>; 'Definition of *plunder*', <https://www.merriam-webster.com/dictionary/depredation#other-words> (All gathered 2022-09-29).

¹⁶⁷ Jon D. Peppetti. 'Building the Global Maritime Security Network: A Multinational Legal Structure to Combat Transnational Threats'. *Naval Law Review*. Vol. 55: 2008. p. 73-156. p. 93.

conventions describing actions causing injury to submarine cables as punishable offenses, such actions would likely be identified as illegal.

Private Ends and Private Ship

Crimes of piracy must be committed for private ends.¹⁶⁸ Not seldom, this prerequisite is associated with the goal of private financial gain,¹⁶⁹ but the International Law Commission has also recognized other motivators: “feelings of hatred or revenge”, for instance.¹⁷⁰ Hence, the requirement for private ends does not necessarily imply *animus furandi*: intent to steal, to gain something.

The term “private ends” is not defined in the High Seas Convention or in UNCLOS, but the meaning of the notion has been discussed in both literature and judgements. In legal doctrine, scholars have attempted to explain the prerequisite through contrasting “private” to something else and there seems to be two leading views of what stands opposite to private: One idea is that private is the opposite of “public”, in the sense that piracy is something else than State-sponsored actions or *privateering* in its historical meaning, i.e. the occurrence of a State commissioning a private ship to violently target another (enemy) ship during armed conflict.¹⁷¹ Because State-sponsored actions fall under the law of armed conflict, while piracy does not, what is essentially interesting for the definition of piracy, in this part, is if the actor possibly held liable is a private person or a State. This rationale is supported by the fact that piracy presumes the use of a private ship and that government vessels normally enjoy immunity on the high seas, save in cases where the crew has not “mutinied and taken control of the ship”.¹⁷² Another commonly held idea is that “private ends” are the opposite of political, ethical or religious ends.¹⁷³ This understanding can be valuable in illustrating the difference between piracy and maritime terrorism.¹⁷⁴

On the High Seas or Outside the Jurisdiction of Any State

Piracy, as it is defined in UNCLOS, can only occur outside the national jurisdiction of any State: Either, specifically, on the high seas, or, generally, in any area beyond national jurisdiction.¹⁷⁵ In other words, piracy can occur on the high seas and in the Area, as these maritime zones are defined in UNCLOS.

¹⁶⁸ *United Nations Convention on the Law of the Sea*. 1982. Article 101(a).

¹⁶⁹ **See, for example**, Mukherjee & Brownrigg. *Farthing on International Shipping*. p. 254.

¹⁷⁰ International Law Commission. *Yearbook of the International Law Commission 1956 Volume II*. New York: United Nations: 1957. p. 282. Article 39, comment 1(i).

¹⁷¹ The Editors of Encyclopedia Britannica. 'Privateer'. *Britannica*.

<https://www.britannica.com/technology/privateer> (Gathered 2022-09-29).; Paige. 'Piracy and Universal Jurisdiction'. p. 134.

¹⁷² *United Nations Convention on the Law of the Sea*. 1982. Articles 95, 96, 101(a) & 102.

¹⁷³ Peppetti. 'Building the Global Maritime Security Network: A Multinational Legal Structure to Combat Transnational Threats'. p. 92.; Paige. 'Piracy and Universal Jurisdiction'. p. 146.

¹⁷⁴ Mukherjee & Brownrigg. *Farthing on International Shipping*. p. 254.

¹⁷⁵ *United Nations Convention on the Law of the Sea*. 1982. Article 101(a)(i)-(ii).

When formulating this requirement, the International Law Commission appears to have had two chief considerations: First, in comments on its UNCLOS Draft Articles, the Commission is clear in its view that when an act of piracy is committed within the territory of a State, it is “a matter for the State affected to take the necessary measures for the repression of the acts committed”.¹⁷⁶ Second, in the same comments, the Commission explains that, while it has had specific non-high seas locations in mind (such as shores of unoccupied territory), its general wish is to prevent “acts committed on ownerless territories from escaping all penal jurisdiction”.¹⁷⁷ Judging from the Commission’s comments, the interests at balance appear to be State sovereignty over national marine territory in one weighing pan, and avoidance of a completely unregulated geographical maritime area, possibly amounting to a pirate safe haven, in the other: The common goal being effective repression of piracy wherever it might occur.

In terms of effectively repressing piracy worldwide, the spatial scope of piracy can be considered limiting. Today, a great amount of “piracy” attacks are not committed in areas beyond national jurisdiction, but along the coasts of States unable to cope with the issue. When this happens in the territorial waters of States which do not have the will or means to control it, the waters become safe havens for pirates.¹⁷⁸ For example, pirates are strategically positioning themselves close to Somalia, where they are in close proximity to one of the World’s busiest shipping routes.¹⁷⁹ In Somalia, the domestic political challenges have been noticeable to the international community, not least with regard to the struggles of repressing “piracy” in waters covered by national jurisdiction.¹⁸⁰

Directed Against a Ship, Aircraft, Persons or Property

The definition in Article 101 (a)(ii) UNCLOS requires the offending ship (or aircraft), i.e. the pirate ship, to direct the action outwards, against something or someone else. In its 1956 comment, the International Law Commission clarifies that internal damage, “against the ship itself, or against persons or property on the ship”, is excluded from the scope.¹⁸¹ Clearly, this has been proven accurate also in practice, as the 1985 hijacking of Achille Lauro was

¹⁷⁶ International Law Commission. *Yearbook of the International Law Commission 1956 Volume II*. New York: United Nations: 1957. p. 282. Article 39, comment 3.

¹⁷⁷ International Law Commission. *Yearbook of the International Law Commission 1956 Volume II*. New York: United Nations: 1957. p. 282. Article 39, comment 4.

¹⁷⁸ Wambua. ‘A critical review of the global legal framework on piracy: 40 years after UNCLOS’. p. 139-140.

¹⁷⁹ Brian Burgess, ‘Forget the Somali Coast – Florida might be the sea piracy capital of the world’. *The Capitolist*. 2017-12-04.

<https://thecapitolist.com/forget-the-somali-coast-florida-might-be-the-sea-piracy-capital-of-the-world/> (Gathered 2022-09-20).

¹⁸⁰ IMO. ‘Piracy: orchestrating the response: Launch of World Maritime Day theme for 2011’. *IMO*. 2011-02-03.

<https://web.archive.org/web/20131105115422/http://www.imo.org/mediacentre/secretarygeneral/speechesbythesecretarygeneral/pages/piracyactionplanlaunch.aspx> (Gathered 2022-09-20).

¹⁸¹ International Law Commission. *Yearbook of the International Law Commission 1956 Volume II*. New York: United Nations: 1957. p. 282. Article 39, comment t 1(vi).

considered to fall outside the definition of piracy for this reason. This was an occurrence impactful enough to lead to new developments in international maritime security law.

Some scholars have held that the “two-ship requirement” is a valid one, because when there is only one ship involved, the exclusive jurisdiction of the flag State applies to the ship as well as everything and everyone on board it. Hence, when there is only one ship involved, national law of the State of registry applies and international law is not needed.¹⁸² This author partly disagrees with that conclusion, as the application of national legislation to solve such an issue is not synonymous with effective enforcement against violent acts at sea. However, in the context of piracy as historically having involved two ships (privateering or robbery at sea) and with regard to interests of State sovereignty expressed through the role of the flag State in areas beyond national jurisdiction, it is understandable that this requirement exists.

On the high seas, the target can be another ship (or aircraft), as well as persons and property on board.¹⁸³ In areas beyond national jurisdiction, targets can be “a ship, aircraft, persons or property”.¹⁸⁴ It has been suggested that Article 101(a)(ii) UNCLOS may be interpreted as broad enough to encompass intentional damage to submarine cables, *property*, when they are located in areas beyond national jurisdiction. Post-doctoral fellow Xuexia Liao opposes this line of reasoning: In her opinion, such an interpretation of Article 101 might “overlook the historical origin” of the provision. Liao explains that UNCLOS incorporates a definition of piracy from the High Seas Convention, which has been said to include internal hijacking. She refers to the International Law Commission’s 1956 Draft Articles and comments, pointing out that the Commission has expressly intended to exclude internal hijacking from the definition.¹⁸⁵ Thereafter, however, she draws the conclusion that the aim of Article 101(a)(ii) UNCLOS must be to extend the scope of the definition of piracy to include internal hijacking, hence not requiring two ships. Therefore, she holds that “theft or destruction of submarine cables are *clearly* beyond the text of Article 101 as they do not involve two vessels, or internal seizures of the ship”.¹⁸⁶

Considering the fact that the International Law Commission does not refer to a specific part of the provision in its comments on Draft Article 39, but rather to what “can be regarded as acts of privacy” in general,¹⁸⁷ it appears to the author of this thesis as if the comment refers to the definition of piracy in its entirety. The author therefore finds it difficult to agree with Liao’s argument that the current Article 101(1)(i) excludes acts directed towards the ship itself, while Article 101(1)(ii) extends the scope to include such acts. Perhaps the slight

¹⁸² Wambua. ‘A critical review of the global legal framework on piracy: 40 years after UNCLOS’. p. 138.

¹⁸³ *United Nations Convention on the Law of the Sea*. 1982. Article 101(a)(i).

¹⁸⁴ *United Nations Convention on the Law of the Sea*. 1982. Article 101(a)(ii).

¹⁸⁵ International Law Commission. *Yearbook of the International Law Commission 1956 Volume II*. New York: United Nations: 1957. p. 282. Article 39, comment (1)(vi) & (6).

¹⁸⁶ **Emphasis added.** Liao. ‘Protection of Submarine Cables against Acts of Terrorism’. p. 472.

¹⁸⁷ International Law Commission. *Yearbook of the International Law Commission 1956 Volume II*. New York: United Nations: 1957. p. 282. Article 39, comment (1)(vi) & (6).

difference in phrasing of the two rules, “another ship” compared to “a ship”,¹⁸⁸ could be interpreted to suggest such a differentiation. Nonetheless, the way in which the provision has been applied in practice suggests something else.

The author argues that the fact that the Achille Lauro hijacking was not considered piracy due to the absence of a “pirate ship”, in combination with the development of new international law to specifically cover such actions following the incident, clearly indicates that hijacking is excluded from Article 101 of UNCLOS altogether. Therefore, the author does not agree with Liao’s conclusion that Article 101(a)(ii) extends the scope to include hijacking, but rather holds that the meaning of the provision is something else: Judging from the text itself, it seems like the act of damaging or stealing property located beyond national jurisdiction of States falls within the scope. Submarine cables are, doubtlessly, *property* and, as they may be laid down in areas beyond national jurisdiction, it is possible for pirates to target them. Viewing this provision in the light of the purpose of the framework as a whole, which is, *inter alia*, to strengthen international peace and security, and recalling the fact that both UNCLOS and other international agreements describe the act of damaging submarine cables as a punishable offense, the author does not oppose interpreting Article 101(a)(ii) to encompass crimes targeting digital infrastructure – submarine cables – in areas beyond national jurisdiction at sea.

3.7.4. Terrorism: Comments on the Scope of Article 3bis(1)(a)(iii) 2005 SUA

Defining “terrorism” has shown to be quite a controversial task and there is currently no internationally agreed definition of the term.¹⁸⁹ Common denominators in definitions of “terrorist acts” are that the actions target a State and its functions, or that they are intended to induce terror, a state of fear, in people affected.¹⁹⁰ In contrast to piracy, which by definition is committed for private ends and tends to be conducted in order to seek private financial gain, terrorist acts are usually committed for political reasons: either in order to gain power, or for the sole purpose of intimidation.¹⁹¹

Determining the “ordinary meaning” of terrorism is a challenge, because terrorism can take many different shapes and is defined in different ways by different States, State actors and organizations. However, despite being developed as a reaction to terrorist acts, terrorism is not explicitly mentioned in the 1988 SUA Convention or its 2005 Protocol: Instead, Article 3bis(1)(a)(iii) 2005 SUA Protocol, which is central for this analysis, refers to an *act* and the *purpose* of that act. Consequently, the purpose, “to intimidate a population, or to compel a government or an international organization to do or to abstain from doing any act”,

¹⁸⁸ **Emphasis added.**

¹⁸⁹ Hans-Peter Gasser. ‘Prohibition of terrorist acts in international humanitarian law’. *Cambridge University Press: International Review of the Red Cross*. Vol. 26(253): 1986. p. 200-212. p. 201.

¹⁹⁰ Department of Emergency and Military Affairs. ‘Various Definitions of Terrorism’. *Department of Emergency and Military Affairs*.

<https://dema.gov/sites/default/files/Publications/AR-Terrorism%20Definitions-BORUNDA.pdf> (Gathered 2022-09-21). **Compare** the definition in the 1937 *Geneva Convention for the Prevention and Punishment of Terrorism*.

¹⁹¹ Mukherjee & Brownrigg. *Farthing on International Shipping*. p. 254.

encompasses terrorist acts while evading the trap of finding the ordinary meaning of the notion “terrorism”.

Unlawfully and Intentionally

In order to be encompassed by Article 3bis(1), an act must be *unlawful* and *intentional*. The 2005 SUA Protocol does not define the meaning of “unlawfully”, but international law has for a long time described breaking or injuring submarine cables, willfully or by culpable negligence, as a punishable offense.¹⁹² Parties to the High Seas Convention and UNCLOS are required to take necessary measures in order to make it an offense punishable by law. Hence, in most cases, such damage to submarine cables would likely be considered unlawful.

The dictionary definition of “intentional” is “done deliberately”.¹⁹³ Hence, the provision clearly includes offenses committed willfully but, as they do not constitute the result of deliberate action, it is unlikely that offenses committed through culpable negligence are covered by this article. This interpretation is further supported by the wording of Article 3bis(1)(a), which stipulates that there must be a certain *purpose* behind the act. Not paying the adequate amount of attention, acting carelessly, can hardly be the target of a provision referring to a purpose which, by its “nature or context”, must be intimidation or to affect the acting of a State or international organization. Hence, the author’s interpretation is that, while UNCLOS requires States to make both intentional and culpable damage to submarine cables punishable by law, this specific SUA provision only covers intentional offenses.

Causes Serious Injury or Damage

In the 2005 SUA Protocol, “serious injury or damage” refers, *inter alia*, to “extensive destruction” of an infrastructure facility resulting in “major economic loss”.¹⁹⁴ Because submarine cables are closely connected to the economy, serious damage to submarine cables might lead to major economic loss. The next question is whether submarine cables can be considered infrastructure facilities in the meaning of the Convention or not. The meaning of “infrastructure facility” in the 2005 SUA Protocol is the same as in the 1997 *International Convention for the Suppression of Terrorist Bombings*, which includes both publicly and privately owned facilities providing or distributing services like communication and energy “for the benefit of the public”.¹⁹⁵ Submarine cables can be owned both privately (usually this is the case) and by States, and they distribute telecommunications services and electrical power. Most actors and sectors benefit from the functions of telecommunications cables and, as society is heavily reliant on broadband, submarine cables doubtlessly provide services for

¹⁹² *Convention on the High Seas* Done at Geneva. 1958. Article II.

¹⁹³ Oxford Learner’s Dictionary. ‘Intentional’. *Oxford Learner’s Dictionary*.

<https://www.oxfordlearnersdictionaries.com/definition/english/intentional> (Gathered 2022-09-20).

¹⁹⁴ *2005 Protocol to the convention for the suppression of unlawful acts against the safety of maritime navigation*. 2005. Article 1(c)(ii).

¹⁹⁵ *2005 Protocol to the convention for the suppression of unlawful acts against the safety of maritime navigation*. 2005. Article 1(2).; *International Convention for the Suppression of Terrorist Bombings*. 1997. Art. 1(2).

the benefit of the public. In consequence, submarine cables facing sabotage which result in “serious injury or damage” are likely covered by the scope of the 2005 SUA Protocol.

With the Purpose to Intimidate or Compel

The scope of Article 3*bis*(1)(a)(iii) of the 2005 SUA Protocol is limited to acts committed with either the purpose to intimidate a population, or the purpose to “compel a government or an international organization to do or to abstain from doing any act”. Even though the definition of piracy requires no intention to steal, the required presence of “private ends” is likely to awaken associations to the end-goal of private financial gain. In contrast, the formulation of this SUA provision seems to refer to purposes having ideological connections, thereby including maritime violence which might fall outside the scope of piracy due to being motivated by political, ethical or religious ideas. Like in the case of piracy, the act needs to have an external target: Instead of another ship, person or property, however, the action must address a population, international organization or State (government) in order to be encompassed by the provision.

Uses a Ship

Finally, in order to fall within the scope of Article 3*bis*(1)(a)(iii) of the 2005 SUA Protocol, the offense must be committed *using* a ship. The 2005 SUA Protocol does not define the meaning of “use” but the dictionary definition of the verb “use” is “to do something with a machine, a method, an object, etc. for a particular purpose”.¹⁹⁶ This definition does not entirely clarify whether the act of injuring a communications cable at sea qualifies as using a ship to commit an offense under the regulation or not.

Can the act of cutting or damaging a submarine cable be considered use of a ship? According to professor Stuart Kaye, this is likely not the case. Kaye argues that using a ship as a direct tool of destruction, the use of a vessel to “ram an installation”, is likely covered by Article 3*bis*(1)(a)(iii). However, as the wording of the provision (“uses a ship”), in his view, seems to target “active deployment of a ship to commit an offense”, Kaye doubts that the use of a ship as a *vehicle* is covered by the provision. He points out that the use of a ship for the purpose of *transportation* at sea, in relation to an act of terrorism, is covered specifically by Article 3*ter* of the Convention, suggesting that these actions are not encompassed by Article 3*bis*.¹⁹⁷ According to Kaye, cutting submarine cables is closely connected to the use of a ship as a form of transportation, rather than the use of a ship as a tool.¹⁹⁸ Other authors have also described the provision as targeting the use of the ship itself as a weapon.¹⁹⁹

¹⁹⁶ Oxford Learner’s Dictionary. ‘Use’. *Oxford Learner’s Dictionary*.

https://www.oxfordlearnersdictionaries.com/definition/english/use_1?q=use (Gathered 2022-09-27).

¹⁹⁷ Kaye. ‘International measures to protect oil platforms, pipelines, and submarine cables from attack’. p. 409-410.

¹⁹⁸ Kaye. ‘International measures to protect oil platforms, pipelines, and submarine cables from attack’. p. 420.

¹⁹⁹ MacDonald. ‘The SUA 2005 Protocol: A Critical Reflection’. p. 503.; Caitlin A. Harrington. ‘Heightened Security: The Need to Incorporate Article 3BIS(1)(A) and 8BIS(5)(E) of the 2005 Draft

The immediate context of the provision is the 2005 SUA Protocol itself, which extends the scope of the 1988 Convention to encompass a greater number of forms of terrorism at sea, in order to meet new challenges. It appears, judging from the preamble, that the Convention aims for a wide scope in order to target terrorism in different shapes and forms. In the view of the author, this is supported by the fact that terrorism is not defined in the text, which makes it possible to avoid exclusion of actions due to a narrow definition, like in the case of piracy. On one hand, these constructions could be understood as a reason to interpret the provisions widely rather than restrictively. On the other hand, it is important to note that the international anti-terrorism regime deals with issues of criminal law, and due to the principle of *nulla poena sine lege* (no punishment without law) – enshrined in, *inter alia*, the *United Nations Covenant on Civil and Political Rights* – it is important not to interpret it too creatively.

While the 2005 amendment to the SUA Convention was influenced in particular by the 9/11 terrorist attacks, which directed the attention of the international community towards the threat which terrorism poses to international peace and security, there were several occurrences in the early 2000s where ships were used as weapons for acts of terrorism at sea. At the time, there was a real problem of so-called “suicide boats” carrying explosives or being rammed into other vessels. Therefore, this author agrees with Kaye that the use of a ship as a weapon is likely what is encompassed by the provision: Traveling by boat in order to reach and cause damage to a submarine cable is not the same as physically using the vessel itself to damage said cable. Therefore, while this author believes that amending the SUA regime to include offenses targeting submarine cables would be in line with the object and purpose of the 2005 SUA Protocol, the author is, recalling the historical context in which it was created, hesitant to interpret the current text as covering such actions.

Lastly, it should be noted that transportation of certain biological and chemical weapons are also considered offenses under the 2005 SUA Protocol.²⁰⁰ If submarine cables are targeted using such weapons, the transportation would be considered an offense under the Convention. This, however, does not provide for a very wide protection, as the scope is limited to weapons which appear unlikely to be used in order to cut a cable.

In the following, a step back is taken from the scope of the analyzed rules in order to investigate the consequences of applying the relevant provisions. Would application of the anti-piracy and -terrorism regimes further the efficient protection of submarine cables in areas beyond national jurisdiction? If so, how?

3.7.5. Consequences of Applying the Anti-Terrorism Regime

What would be the benefits of the SUA regime covering the offense of damaging submarine cables? The short answer is that, despite being applicable to offenses committed in areas

Sua Protocol into Part VII of the United Nations Convention on the Law of the Sea’. *Pacific Rim Law & Policy Journal*. Vol 16(1): 2007. p. 107-136. p. 121.

²⁰⁰ 2005 Protocol to the convention for the suppression of unlawful acts against the safety of maritime navigation. 2005. Article 3bis(b).

beyond national jurisdiction, the SUA Convention reaches beyond the limits of exclusive flag State jurisdiction and extends jurisdictional possibilities to other States as well.

The SUA Convention puts obligations on States, both in terms of legislation and enforcement. Offenses listed in Article 3*bis*(1)(a)(iii) of the 2005 SUA Protocol, which could possibly be applicable to offenses targeting submarine cables, are covered by the scope of the Convention. Article 5 of the 2005 Protocol obliges State Parties to make the offenses punishable "by appropriate penalties", bearing in mind their grave nature. In terms of enforcement jurisdiction, Article 6 of the 1988 SUA Convention includes a list of situations where State Parties *shall* or *may* establish jurisdiction over crimes covered by the Convention, now including offenses listed in Article 3*bis*(1)(a)(iii) and other offenses added through the 2005 amendment. The flag State is obliged to establish jurisdiction if its flagship is an offender (or victim) ship, or if the person committing the offense is a national of that State.²⁰¹ This can, very well, be two different States and it is especially likely that this is the case when the State of registry is an open registry State. Furthermore, it is possible for States to establish jurisdiction on other grounds, such as the habitual residence of the offender or the fact that the offense committed is directed towards that State in order to compel it to act or abstain from acting.²⁰² Consequently, the 1988 SUA Convention "essentially employs a system of universal jurisdiction for crimes that fall within its scope".²⁰³

Additionally, the 2005 SUA Protocol promotes international cooperation through providing a possibility for flag States to request *assistance* from other States in suppressing offenses involving its flag ships.²⁰⁴ It also introduces a right of visit for non-flag States when there are reasonable grounds to suspect a ship's engagement in crimes covered by the Convention.²⁰⁵ As boarding requires authorization from the flag State, the right of visit is in no way absolute and the flag State remains in control. This distinguishes the mechanism from the right of visit in UNCLOS and the Paris Convention, where no prior flag State authorization is required. Despite requiring authorization in all cases of non-flag State interference, the 2005 SUA Protocol provides possibilities for the flag State to make the authorization procedure somewhat automatized: The flag State may choose not to authorize visits on a case-by-case basis.²⁰⁶ In contrast to e.g. Article 105 UNCLOS (on enforcement jurisdiction against piracy), there is no mention of States having the right to prosecute or arrest foreign-flagged ships; For crimes covered by SUA, this competence remains with the exclusive jurisdiction of the flag

²⁰¹ *Convention for the Suppression of Unlawful Acts Against the Safety of Maritime Navigation*. 1988. Article 6(1)(a) & (c).

²⁰² *Convention for the Suppression of Unlawful Acts Against the Safety of Maritime Navigation*. 1988. Article 6(1)(1) & (c).

²⁰³ Scanlon, 'Addressing the Pitfalls of Exclusive Flag State Jurisdiction: Improving the Legal Regime for the Protection of Submarine Cables'. p. 315.

²⁰⁴ *2005 Protocol to the convention for the suppression of unlawful acts against the safety of maritime navigation*. 2005. Article 8*bis*(4).

²⁰⁵ *2005 Protocol to the convention for the suppression of unlawful acts against the safety of maritime navigation*. 2005. Article 8*bis*(5).

²⁰⁶ *2005 Protocol to the convention for the suppression of unlawful acts against the safety of maritime navigation*. 2005. Article 8*bis*(5)(d)-(e).

State.²⁰⁷ Nonetheless, even when the flag State is exercising this exclusive competence, there are elements of inter-State cooperation present: In the context of the 2005 SUA Protocol, the flag State may – on a case-by-case basis only – authorize a requesting (visiting) State to “detain the ship, cargo and persons on board”.²⁰⁸

In sum, under the original SUA Convention, the flag State has an important role with regard to jurisdiction. However, there are also several possibilities for other States to establish jurisdiction over offenses encompassed by the SUA regime, based on a number of connecting factors concerning the offender and victim persons and ships. There are also additional rules on practical cooperation, such as extradition, among States. The 2005 SUA Protocol adds to this order by providing a possibility for flag States to ask other States for assistance, and to authorize other States to visit and even detain its flag ships. At the same time, the flag State enjoys a central position whereby its relation to its registered ships is respected. Compared to the piracy provisions in UNCLOS, the flag State appears to have more control over the actions of other States with regard to repression of crimes covered by the SUA order. On one hand, this can be considered a positive aspect in terms of honoring State sovereignty and, by extension, the role of the flag State in areas beyond national jurisdiction. On the other hand, this order might cancel out the possibilities for cooperation provided in the Convention, as “authorization is unlikely to be granted where relations between the flag State and the interdicting State are strained or where the suspect vessel is a State-owned and operated commercial vessel”.²⁰⁹

In conclusion, applying the SUA Convention to offenses targeting submarine cables, which are committed in areas beyond the national jurisdiction of States, could result in inter-State cooperation on the matter. This could lead to repression of unwanted consequences resulting from the order of exclusive flag State jurisdiction on the matter. Naturally, States included would have to be Parties to the relevant treaties and, while 162 States have ratified the 1988 SUA Convention, the number of States having ratified the 2005 amendment is more modest: To date, only 40 States have ratified it.²¹⁰

3.7.6. Consequences of Applying the Anti-Piracy Regime

If damage done to submarine cables located in areas beyond national jurisdiction of States would fall within the definition of “piracy”, as it is described in Article 101 UNCLOS, Article 105 UNCLOS would become applicable. According to UNCLOS, all States are obliged to cooperate in the repression of piracy, be it on the high seas or in any other area

²⁰⁷ *2005 Protocol to the convention for the suppression of unlawful acts against the safety of maritime navigation*. 2005. Article 8bis(8).

²⁰⁸ *2005 Protocol to the convention for the suppression of unlawful acts against the safety of maritime navigation*. 2005. Article 8bis(6).

²⁰⁹ MacDonald. ‘The SUA 2005 Protocol: A Critical Reflection’. p. 514. With reference to Brown (n 183) at p. 83.

²¹⁰ IMO. ‘Status of multilateral Conventions and instruments in respect of which the International Maritime Organization or its Secretary-General performs depositary or other functions’. *IMO*. 2017-07-11.

beyond national jurisdiction.²¹¹ When doing so, any State has the right to seize, arrest and prosecute pirates.²¹² Hence, despite the fact that piracy can only be committed in areas beyond national jurisdiction, exclusive flag State jurisdiction does not apply. This entails an extension of enforcement jurisdiction to States other than the flag State.

In contrast to the SUA regime, there are no specific requirements which have to be met in order for States other than the flag State to act: *All* States, using government ships, may act in order to repress piracy on the high seas or in areas beyond national jurisdiction, under the presumption that the offense can be considered piracy and that the offender vessel does not enjoy immunity.²¹³ In Article 95 and 96 UNCLOS is expressly stated that warships and non-commercial government vessels on the high seas have “complete immunity” from other jurisdictions than that of the flag State, save in cases where the crew has not “mutinied and taken control of the ship”.²¹⁴

The possibility of States to collectively interfere against pirates on waters beyond national jurisdiction is often referred to as an expression of *universal* jurisdiction, the right of all States to capture, try and punish offenders.²¹⁵ In fact, until the second World War, piracy was considered the “first and only crime under universal jurisdiction”.²¹⁶ However, it has been contested that universal jurisdiction actually applies to piracy. Universal jurisdiction generally seeks to enable States to take action against serious crime committed outside their territory, not involving its nationals.²¹⁷ This order typically applies to particularly heinous crimes, repression of which can be considered a common interest of the international community as a whole: examples are *jus cogens* crimes such as genocide and torture. While piracy has historically been considered a heinous crime, this has not consistently been the case.²¹⁸ Consequently, there is some opposition towards juxtaposing piracy with other crimes, like genocide, which are covered by universal jurisdiction on the basis of their heinous nature. This view has been expressed by Dr. Tamsin Paige who, by referring to the wording of Article 105 alongside the rich history of piracy, argues that jurisdiction covering piracy is not *universal* but rather *municipal*. Paige illustrates this by pointing to the fact that the current “universal” repression of piracy is restricted to areas beyond national jurisdiction: For

²¹¹ *United Nations Convention on the Law of the Sea*. 1982. Article 100.

²¹² *United Nations Convention on the Law of the Sea*. 1982. Article 105.

²¹³ *United Nations Convention on the Law of the Sea*. 1982. Article 105 & 107.

²¹⁴ *United Nations Convention on the Law of the Sea*. 1982. Article 102.

²¹⁵ Benton. 'Toward a New Legal History of Piracy: Maritime Legalities and the Myth of Universal Jurisdiction'. p. 225.

²¹⁶ Sicking. 'God's Friend, the Whole World's Enemy: Reconsidering the Role of Piracy in the Development of Universal Jurisdiction'. p. 184.

²¹⁷ European Center for Constitutional Human Rights. 'Term: Universal jurisdiction'. *European Center for Constitutional Human Rights*. <https://www.ecchr.eu/en/glossary/universal-jurisdiction/> (Gathered 2022-09-15).

²¹⁸ Sicking. 'God's Friend, the Whole World's Enemy: Reconsidering the Role of Piracy in the Development of Universal Jurisdiction'. p. 176-177.

instance, a warship will not exercise the power to seize a pirate ship within the territorial waters of another State.²¹⁹

Like Paige, this author interprets Article 105 as having a geographically delimited scope: It is clear from the wording “On the high seas, or in any other place outside the jurisdiction of any State, every State may...” that only areas beyond national jurisdiction are covered by the provision and, therefore, the scope cannot be universal in the geographical sense. At the same time, the author does not believe that this fact is of grand significance in this case, as piracy, per definition, cannot occur beyond the areas covered by Article 105. Additionally, the competences, as they are described in Article 105, do not have any other links to nationality of the pirates, registration of the ship, etcetera: Thus, the other central elements of universal jurisdiction appear to be present. Consequently, the author sees no particular obstacle to viewing Article 105 as an expression of universal jurisdiction on the matter, applicable to all geographical areas where piracy, as it is defined in UNCLOS, might occur.

3.8. Protection of Submarine Cables During Armed Conflict

Submarine cables are in many ways essential during armed conflict and, in particular, this has been the case following the introduction of the Internet. During armed conflict, digital infrastructure is valuable to States as it facilitates exchange of intelligence, enabling efficient military operations: For this reason, such structures are considered strategic targets.²²⁰ Due to the military benefits of using submarine telecommunications cables they might be considered *military objectives*, lawful targets.²²¹ The rules previously analyzed in this chapter apply in peacetime: It is clear from the wording of the above provisions, and from the suggestions of complementary solutions, that the international community does not agree with intentional or culpable damage to submarine cables in peacetime. In times of armed conflict, these actions have historically been viewed differently but, arguably, this is no longer the case.

Historically, submarine cables have been considered military objectives and, consequently, been treated as such. Prior to the First World War, cutting telecommunications cables of a belligerent State was said to be lawful in cases where it was *absolutely necessary*. However, State practice during the two World Wars has shown that, in practice, it has been considered acceptable to cut cables of belligerent States even without the presence of absolute necessity. In contrast, cables of neutral States were not to be cut even during armed conflict.²²² The perspective of regarding submarine cables as legitimate targets during armed conflict is also

²¹⁹ Tamsin Paige. 'Piracy and Universal Jurisdiction'. *Macquarie Law Journal*. Vol. 12: 2013. p. 131-154. p. 148-149.

²²⁰ McLaughlin, Paige & Guilfoyle. 'Submarine Communication Cables and the Law of Armed Conflict: Some Enduring Uncertainties, and Some Proposals, as to Characterization'. p. 4-5 & 31.

²²¹ McLaughlin, Paige & Guilfoyle. 'Submarine Communication Cables and the Law of Armed Conflict: Some Enduring Uncertainties, and Some Proposals, as to Characterization'. p. 30-32; ICRC. 'The Law of Armed Conflict'. *ICRC*. 2002-06.

https://www.icrc.org/en/doc/assets/files/other/law3_final.pdf (Gathered 2022-10-14). p. 2-3.

²²² McLaughlin, Paige & Guilfoyle. 'Submarine Communication Cables and the Law of Armed Conflict: Some Enduring Uncertainties, and Some Proposals, as to Characterization'. p. 41-42.

suggested by the fact that the Paris Convention explicitly exempts the “freedom of action of belligerents” from its scope and, thus, only applies outside the limits of armed conflict.²²³

In an article on the topic, Dr. McLaughlin, Dr. Paige and Associate Guilfoyle argue that submarine telecommunications cables are no longer legitimate targets during armed conflict, because such an attack would likely fail the proportionality test. As most submarine cables (98%) today are commercial non-State cables, it is hard to separate military utilization from civilian use. Therefore, an attack on a modern submarine cable would not only result in damage to military operations of belligerent States, but also advance far beyond its target, affecting both neutral States and civilian populations. In the unlikely event of attacks on modern submarine cables being considered proportionate, the authors argue that due warning should be given prior to the attack.²²⁴ The conclusion that most attacks on submarine cables would be disproportionate is supported by other authors as well: Dr. Bueger, Postdoc. Liebetau and research assistant Franken stress the importance of proportionality and emphasize that, due to the potential effects attack targeting submarine cables could have on the civilian population, “[t]he larger the extent of the military purpose of a submarine cable, the higher its probability is to be targeted in a conflict”.²²⁵ In conclusion, the increased importance of submarine telecommunications cables for non-State users, and the difficulty in separating military and civilian utilization of this infrastructure, strongly points in the direction of damage to submarine cables – even during armed conflict – being unlawful due to its insufficient proportionality.

3.9. Summary: Protection of Submarine Cables in International Law

In the international law of the sea there are two areas beyond national jurisdiction, the high seas and the Area, which are governed by fundamentally different principles. Under the high seas, which sometimes comprise superjacent waters to the Area, all States may lay down submarine cables. Submarine telecommunications cables constitute critical infrastructure and their protection has been considered a common interest of the international community, therefore, they are protected by international law. There are three international treaties describing the act of injuring submarine communications cables in areas beyond national jurisdiction in peacetime, willfully or by culpable negligence, as a punishable offense. In line with the order normally applied to the high seas, the conventions assign the jurisdictional responsibility primarily (Paris Convention) or exclusively (High Seas Convention and UNCLOS) to the flag State. In times of armed conflict, submarine cables have historically been considered legitimate targets. Nonetheless, due to the potential consequences for the civilian population and neutral States, it is unlikely that such attacks would be considered lawful at present, with regard to proportionality of its potential consequences.

²²³ *Convention for the Protection of Submarine Telegraph Cables*. 1884. Article VI.

²²⁴ McLaughlin, Paige & Guilfoyle. ‘Submarine Communication Cables and the Law of Armed Conflict: Some Enduring Uncertainties, and Some Proposals, as to Characterization’. p. 34 & 41-42.

²²⁵ Bueger, Liebetau & Franken. *Security threats to undersea communications cables and infrastructure – consequences for the EU*. p. 23.

The explicit protection of digital infrastructure beyond national jurisdiction in maritime law is constructed in line with international law of the sea concerning areas beyond national jurisdiction in general: The flag State is responsible for establishing legislation concerning damage to submarine cables and, as it has exclusive jurisdiction over its flag ships on the high seas, it is also expected to enforce such rules. In other areas of maritime law where exclusive flag State jurisdiction has proven not to be sufficient in effectively handling an issue, the international community has introduced possibilities for international cooperation.

Some scholars have suggested that protection of submarine cables, provided *inter alia* in Article 113 UNCLOS, can be strengthened by help of already existing provisions allowing for inter-State cooperation in areas beyond national jurisdiction. Under the SUA regime, which targets crimes amounting to maritime terrorism, there are mechanisms in place enabling cooperation through authorized visit and seizure. Moreover, under the UNCLOS anti-piracy regime, all States may visit, seize and arrest offender ships engaged in piracy. Although none of these orders explicitly mention damage done to submarine cables in areas beyond national jurisdiction, some scholars argue that such offenses, by way of interpretation, can be considered encompassed by present orders on international cooperation on maritime security. There is no consensus on this matter and, as has been illustrated by the above analysis, it is not clear whether or not such offenses constitute piracy or terrorism as those terms are currently understood in the international law of the sea.

Based on the purpose of the frameworks in which the provisions on cooperation on repression of piracy and maritime terrorism exist, the author holds that it would not be inappropriate to *amend* the present regimes to encompass offenses targeting submarine cables. The author argues that, in the context of protecting digital communications infrastructures in areas beyond national jurisdiction, the considerations and principles enshrined in the provisions concerning piracy and maritime terrorism have potential to become valuable additions to the exclusive jurisdiction of the flag State and thereby strengthening the protection. Consequently, the author concludes that the now mentioned protective regimes, regardless of whether they are currently applicable to offenses targeting submarine cables or not, are relevant to consider when discussing the development of protective legislation regarding digital infrastructure in outer space. Therefore, in the following chapter, these suggestions are analyzed in the context of protecting digital infrastructure in outer space.

Chapter 4. The International Law of Outer Space

States “bear international responsibility for national activities in outer space [...] whether such activities are carried out by governmental agencies or by non-governmental entities” and, with regard to non-State actors, States must authorize and supervise such activity.²²⁶ Additionally, if a State or a person under its jurisdiction causes damage to a space object in outer space, the responsibility for compensation is attributed to the State.²²⁷ Clearly, international law relies upon States to uphold legal order and to ensure compliance with international law in outer space. This implies that crimes committed in outer space, by persons subject to the jurisdiction of a State, fall within the responsibility of the State Party in question. However, nothing in international outer space law specifically describes the act of damaging digital infrastructure as being a punishable offense: There is no protective legislation for satellites in international law which resembles the protection of submarine cables in the international law of the sea.

The previous chapters have provided an understanding of digital infrastructure covered by the international law of the sea and how it is, and could possibly be, protected from damage caused by humans. Henceforth, the focus is shifted from the present to the future, from sea to outer space. Could protection of digital infrastructure in outer space be inspired by already existing solutions in the international law of the sea, as they have now been described and analyzed? In this chapter, the two focal points of this thesis are connected by way of analogy: First, the international law of the sea and the international law governing outer space are compared in order to investigate the differences and similarities between the two systems. Second, the practical challenges faced by digital communications infrastructures at sea and in outer space are compared, for the same reason. Third and finally, analogical reasoning is applied with the aim to draw inspiration from the protection of digital infrastructure in the law of the sea and to apply it in the context of outer space law. As reasoning by analogy presumes similarity between the source and target area, a prior comparison is important in order to facilitate the analysis in the third step.

4.1. Elements of the Area and the High Seas in International Outer Space Law

In the international law of the sea, installation of digital infrastructure in areas beyond national jurisdiction is described as a high seas freedom. Hence, while the offense of damaging submarine cables does not only occur on the high seas, this maritime zone is closely connected to matters associated with submarine cables. This is interesting as the high seas and the Area, despite both being maritime zones beyond the national jurisdiction of any State, are guided by fundamentally different principles.

²²⁶ *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*. 1967. Article VI.

²²⁷ *Convention on International Liability for Damage Caused by Space Objects*. 1972. Article III.

The international principles governing outer space describe the “exploration and use of outer space for peaceful purposes” as a *common interest of all of mankind*.²²⁸ This is also mentioned in the preambles of several of the international treaties concerning outer space.²²⁹ Like the Area, the Moon and its resources are considered “common heritage of mankind”.²³⁰ Moreover, the 1967 *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies* (OST) stipulates that all States are free to explore and use outer space, provided that the activities are in accordance with international law and that exploration is carried out “for the benefit and in the interests of all countries”.²³¹ In a similar manner, activities in the Area must be carried out for peaceful purposes only, and “for the benefit of mankind as a whole”.²³² Like the Area, outer space must be used for the common benefits of mankind and not solely to satisfy the interests of one particular State. This contrasts to the logic applied to the high seas, whereby the waters and its resources are labeled *res communis omnium*, free for all States to exploit and explore. Thus, even though international outer space law is at large built using a high seas analogy,²³³ some of the key principles governing outer space are more similar to the principles governing the Area.

Despite the similarities, there is an interesting difference between the order of outer space and the domain of the Area: In the international law of the sea, the International Seabed Authority plays an important part guaranteeing the equal sharing of benefits derived from the Area.²³⁴ The Authority has quite an active role as it acts on behalf of mankind as a whole and may carry out research in the Area, enter into agreements, develop rules for the protection of the marine environment, etcetera.²³⁵ In international outer space law, there is no corresponding organization actively working to ensure the equal sharing of benefits. While States are required to *inform* the United Nations and the international community about actions relating to the exploration of the Moon, and may *request consultations* with other States suspected to not meet the requirements of the *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*, there is no organization assigned the mission to actively safeguard the persistence of the “common heritage of mankind” status.²³⁶

²²⁸ General Assembly Resolution XVIII. *Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space*. 1962.

²²⁹ *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*. 1967. Preamble.; *Convention on Registration of Objects Launched into Outer Space*. 1974. Preamble.

²³⁰ *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*. 1979. Article 11; *United Nations Convention on the Law of the Sea*. 1982. Article 136.

²³¹ *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*. 1967. Articles III & I paras 1-2.

²³² *United Nations Convention on the Law of the Sea*. 1982. Articles 140 & 141.

²³³ This is further analyzed below, at 4.2.

²³⁴ *United Nations Convention on the Law of the Sea*. 1982. Article 140(2).

²³⁵ *United Nations Convention on the Law of the Sea*. 1982. Articles 137(2), 143(2) & 145.

²³⁶ *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*. 1979. Article 15 &, e.g. 5-7.

In sum, the international law of outer space resonates with key elements associated with the Area, while protection of digital infrastructure in areas beyond national jurisdiction in the international law of the sea is closely connected to the high seas regime. Because these maritime areas are governed by completely different principles, one could question whether it would be appropriate to use rules associated with one zone (the high seas) to develop provisions in an area treated similarly to the other (the Area). The author argues that, while space law is reminiscent of considerations connected to the Area, there are also important similarities to the high seas regime. International law assigns the protection of submarine cables in areas beyond national jurisdiction to the flag State which, on the high seas, has a central role in upholding law and order and thereby safeguarding the possibility of exercising high seas freedoms. Hence, the rules on protection in the law of the sea exist in a context where the importance of the flag State is emphasized and, importantly, the significance of the flag State is stressed also in the law governing outer space.

4.1.1. The Principle of Non-Appropriation and the Role of the Flag State

As they may not be subjected to the sovereignty of any State, the high seas, the Area and outer space are all areas covered by a clear principle of non-appropriation.²³⁷ Because territorial jurisdiction cannot be resorted to, alternative solutions for assuring law and order must be sought. Consequently, at sea and in outer space, the flag State has become an actor of central importance with regard to this issue and, in both cases, its jurisdiction reaches vessels in its register as well as the personnel on board flagged vessels.^{238 239} On the high seas, ships may fly the flag of one State only and each State determines the conditions for registration under its flag.²⁴⁰ The same logic is applied in the outer space context: Regardless of how many States are involved in a launch, there can only be one State of registry for an object launched into space.²⁴¹ Thus, a clear similarity between the law of the sea and the law of outer space is that, in areas beyond national jurisdiction, no State enjoys territorial jurisdiction but, at least in theory, every vessel is subjected to the sovereignty of a State.

In the outer space context, registration can become a complicated matter when States jointly launching a space object struggle to determine the (single) State of registry.²⁴² In the law of the sea context, perhaps because the process is different, the same issue is not as common: The ship owner applies for registration based on the admission requirements formulated by the potential flag State, and thereby chooses a State of registry. Moreover, outer space law

²³⁷ *United Nations Convention on the Law of the Sea*. 1982. Articles 1(1) & 89.; *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*. 1967. Article II.

²³⁸ *United Nations Convention on the Law of the Sea*. 1982. Articles 91-92.; *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*. 1967. Article VIII.

²³⁹ *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*. 1967. Article VIII.

²⁴⁰ *United Nations Convention on the Law of the Sea*. 1982. Articles 92(1) & 91(1).

²⁴¹ *Convention on Registration of Objects Launched into Outer Space*. 1974. Article II(2)-(3).

²⁴² Bielicki. 'Legal Aspects of Satellite Constellations'. p. 253-254.

covering registration derives from a special treaty on the topic which all States are not Parties to. Consequently, there are States actively participating in space activities without having a national register.²⁴³ States not partaking in registration of ships is not a noticeable issue in the law of the sea, because UNCLOS is a “package-deal” treaty, not only being extensive in scope but also precluding all reservations.²⁴⁴ Thus, if a State ratifies the Convention, the Convention is ratified in its entirety and it is not possible to set aside isolated parts, such as rules on registration. In the law of the sea the problems connected to registry are rather associated with inadequate flag State responsibility (such as issues arising in relation to flags of convenience) than with lacking registration.

Another similarity between the high seas and the outer space regime is that all States enjoy equal rights to explore and use both areas,²⁴⁵ under the conditions that it is done peacefully and in accordance with international law.²⁴⁶ Here, it should be noted that *use* is not necessarily synonymous with free, unlimited exploitation. Furthermore, both maritime and outer space legislation requires States to show *due regard* towards the rights of other States in these areas, as they are common areas free for States to use collectively.²⁴⁷ In international law it is clear that exploration and use of outer space should be guided by principles of cooperation and mutual assistance.²⁴⁸ The idea of cooperation is not foreign to the law of the sea, in fact it is one of the fundamental principles on which UNCLOS is built: At times, for instance regarding the repression of piracy, it is even expressly required by the Convention.²⁴⁹

In sum, there are key features in international outer space law which are similar to those governing the Area and the high seas, respectively. Like marine areas beyond national jurisdiction, outer space cannot be owned by any State, order is upheld by help of the (one) State of registry, international law applies and the area is reserved for peaceful purposes. A difference is that outer space law is divided into five multilateral United Nations treaties, while most of the international law of the sea is compiled in one treaty on the matter, UNCLOS. Consequently, outer space law provides greater opportunities for States to select which rights and obligations should apply to them, while the law of the sea uses an *all-or-nothing* approach. Another difference is that, in outer space law, there is no organization corresponding to the Authority.

²⁴³ Bielicki. ‘Legal Aspects of Satellite Constellations’. p. 254 & 262.

²⁴⁴ *United Nations Convention on the Law of the Sea*. 1982. Article 309.

²⁴⁵ *United Nations Convention on the Law of the Sea*. 1982. Article 87, “navigate and use”; *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*. 1967. Article I, “explore and use”.

²⁴⁶ *United Nations Convention on the Law of the Sea*. 1982. Articles 88 & 94.; *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*. 1967. Articles III & IV.

²⁴⁷ *United Nations Convention on the Law of the Sea*. 1982. Article 87(2).; *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*. 1967. Article IX.

²⁴⁸ *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*. 1967. Article IX.

²⁴⁹ *United Nations Convention on the Law of the Sea*. 1982. Preamble & Article 100.

4.2. Influences from the International Law of the Sea

Considering the evolution of international law governing outer space, it is hardly surprising that the current regulation shares elements with the law of the sea. When humans began their journey into outer space, the development of technology enabling space activities was in particular fueled by the Cold War. At the time, the international community had concerns about potential warfare in outer space and, consequently, international law on outer space in the late 1950s came to have two main focal points: First, as is suggested by e.g. the allocation of responsibility for acts in space,²⁵⁰ States and State action (rather than the private sphere) were of central concern. Second, the development had to be rapid in order to avoid a situation where acts committed in outer space would come to exist in a *vacuum juris*.

In order to quickly formulate rules and principles, inspiration was taken from other areas of international law, especially from the international law of the sea which provided significant inspiration on how to regulate areas located beyond national jurisdiction. Although the law of the sea has been an important source of inspiration for outer space law, international outer space law constitutes a mixture of elements from different areas of law and is not necessarily a carbon copy of the law of the sea.²⁵¹ When deciding on a main direction for the outer space regime, the international community discussed whether high seas law or air space law would be the most appropriate source of analogy. With the ongoing Cold War, East and West initially took opposite standpoints: The USSR favored the air space analogy and the West argued for the high seas analogy. In the end, following the acceptance of the 1961 *General Assembly Resolution 1721A* expressing agreement on, *inter alia*, the principle of non-appropriation of outer space, both sides managed to agree on the high seas approach.²⁵²

Being an area geographically close to outer space and delimited by somewhat undefined limits, it would not have been shocking to see air law serve as a central source of inspiration for outer space law. However, air law is characterized by State sovereignty rather than sharing and cooperation: While these elements could have led to a fragmentation of outer space, the international community was leaning towards treating outer space as a common area. This can be illustrated by the fact that States did not require authorization for space objects in orbit above their territory at this time. Consequently, the high seas analogy became prevalent in developing outer space law but some elements of outer space law, such as the principles of non-appropriation and free use, also apply to international air spaces.²⁵³

As mentioned in the above comparison between outer space and maritime zones beyond national jurisdiction, the international law governing outer space includes elements

²⁵⁰ *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*. 1967. Article VI.

²⁵¹ Salvatore Aricò (ed.). *Ocean Sustainability in the 21st Century*. Cambridge University Press. 2015-05. p. 270-271. p. 249.

²⁵² MJ. Peterson. 'The Use of Analogies in Developing Outer Space Law'. *The MIT Press*. Vol. 51(2): 1997. p. 245-274. P. 255.

²⁵³ Aricò (ed.). *Ocean Sustainability in the 21st Century*. p. 250-252.

reminiscent of the law on the high seas: The principle of non-appropriation, the freedom of exploration and use, and the application of international law. There are also elements similar to those of the Area. Although other analogies have been resorted to where maritime law has not sufficed, the international law of the sea has served as a central source of inspiration for the development of outer space law. Therefore, the author argues that, as a point of departure, it would be appropriate to introduce further rules inspired by the international law of the sea in the milieu of current international outer space law. Such rules would be implemented in a familiar context, built on similar considerations, values and goals. However, the principal object of this thesis is not to conclude a general conformity between the landscape of international outer space law and international maritime law, but rather to focus on the more concrete subject of protection of digital infrastructures. Therefore, the functions of, and challenges faced by, digital infrastructures at sea and in outer space will now be analyzed in order to conclude if they are similar enough to benefit from application of analogy reasoning.

4.3. Location of Satellites

Digital infrastructure is not limited to submarine cables and satellites, but for transmission of telecommunications services these are currently, by far, the two most relevant options. As satellites would be one of the main targets for legislation protecting digital infrastructure in outer space, it is important to establish whether they are covered by international law on outer space or not. Are satellites located in the airspace above State territory on Earth, where a State enjoys exclusive sovereignty,²⁵⁴ or are they located beyond air space, where outer space begins and national sovereignty ends?²⁵⁵

To date, there is no clear consensus on where the line between air space and outer space should be drawn. In the 1900s, physicist Theodore Kármán calculated a boundary, the “Kármán line”, which was further emphasized by astronomer Jonathan C. McDowell in 2018. Originally, the line was calculated to approximately 80 kilometers above sea level but today the notion usually refers to an altitude of 100 kilometers over sea level.²⁵⁶ Around this limit, the atmosphere becomes too thin to carry a conventional aircraft.²⁵⁷

Most satellites are located in either the thermosphere or exosphere of the Earth’s atmosphere. The thermosphere is mostly suitable for low orbiting satellites, while the exosphere hosts

²⁵⁴ Bin Cheng. ‘Air Law’. *Britannica*. <https://www.britannica.com/topic/air-law> (Gathered 2022-09-11).

²⁵⁵ *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*. 1967. Article II.

²⁵⁶ Jonathan C. McDowell (2018). ‘The edge of space: Revisiting the Karman Line’. Cambridge: *Harvard-Smithsonian Center for Astrophysics*. 2018. <https://reader.elsevier.com/reader/sd/pii/S0094576518308221?token=F0821B6B6868EB5E8EBF710728B3C746017AE6C117FC917DCF32FF740EB6807B18761EB3F1A89A630DEBB170FE6D3F39&originRegion=eu-west-1&originCreation=20220911144733> (Gathered 2022-09-11).

²⁵⁷ National Environmental Satellite Data and Information Service. ‘Where is space?’. 2016-02-22. *National Environmental Satellite Data and Information Service*. <https://www.nesdis.noaa.gov/news/where-space> (Gathered 2022-09-11).

satellites used for weather and communications.²⁵⁸ The thermosphere reaches 85-600 km above the Earth's surface, and the exosphere begins at around 600 km and reaches up to 10 000 km.²⁵⁹ Hence, these areas begin above the original 80 km Kármán line currently used by, for example, NASA and the U.S. air force to define the limit of outer space, and reach far beyond the 100 kilometer line. Thus, the author concludes that satellites are located in outer space rather than the airspace of States and, hence, that they are encompassed by international outer space law. As submarine cables can be laid down both within and beyond national jurisdiction of States, different rules for their protection can be applied depending on their location. Because outer space in its entirety constitutes an area beyond national jurisdiction, it is likely that only one set of rules will be needed to protect infrastructure in outer space.

4.4. Comparison: Threats to Digital Infrastructures at Sea and in Outer Space

Both submarine cables and satellites are expensive structures which comprise the result of many years of research and technological development. It is time consuming and costly to construct and repair them, meanwhile they are quite fragile, sensitive to physical damage. As mentioned in *Chapter 2*, the practical threats to these structures differ: Anchoring incidents do not comprise a recurring threat to satellites and submarine cables are not at constant risk of being hit by "space junk". Nonetheless, there are common denominators between threats directed towards these structures.

4.4.1. Damage Caused Through Culpable Negligence

Damage can be caused unintentionally, through the acts of humans. At sea, fishing equipment and anchors often cause damage to submarine digital infrastructure. In outer space, damage to digital infrastructure is currently not as common, but satellites are constantly at risk of being hit by space debris: non-functional satellites or by-products from launching objects into outer space, which are orbiting the Earth simply due to human activity. Due to the development of satellite constellations ("fleets"), consisting of clusters of satellites which are launched simultaneously from Earth into outer space, the amount of space debris will likely increase dramatically in the near future.²⁶⁰ Consequently, the issue of space debris is an increasingly relevant one. If a satellite is hit and destroyed by debris in orbit, it is likely not a question of an intentional attack targeting the structure. Nonetheless, the release of waste into outer space without any subsequent attempts to remove it could perhaps be considered an act of culpable negligence by either the owner of the space object, or the launching State.

²⁵⁸ World Atlas. 'Where Do Artificial Satellites Orbit The Earth: In The Atmosphere Or Outer Space?'. *World Atlas*.

<https://www.worldatlas.com/articles/where-do-artificial-satellites-orbit-the-earth-in-the-atmosphere-or-outer-space.html> (Gathered 2022-09-08).

²⁵⁹ National Weather Service. 'Layers of the Atmosphere'. *National Weather Service*.

<https://www.weather.gov/jetstream/layers> (Gathered 2022-09-11).

²⁶⁰ Bielicki. 'Legal Aspects of Satellite Constellations'. p. 245.

4.4.2. Intentional Damage

At sea, there are examples of intentional physical damage to digital infrastructure in the shape of hauling and cutting of submarine cables. In outer space it is, at least not at present, likely that private persons will manage to access and physically break digital infrastructure. States, on the other hand, are currently developing weapons which are designed to destroy such structures in outer space. Traditional anti-satellite weapons (ASATs), for instance, consist of satellites loaded with explosives which are launched into orbit in order to destroy other (specified) satellites.²⁶¹ This is reminiscent of how vessels at sea (illegally) can be used as weapons through being rammed into other vessels or installations, or by carrying weapons of destruction for the same purpose. China, Russia and the U.S. have invested “heavily” in ASATs and both China and the U.S. have successfully tested such weapons, in 2007 and 2008 respectively.²⁶² Not only are ASAT weapons capable of destroying digital infrastructure in space, thus enabling intentional attacks: The use of ASATs also creates significant amounts of space debris, hence increasing the risks of injury already faced by satellites in orbit.²⁶³

The use of ASATs is covered by the international law on armed conflict. As mentioned in *Chapter 3*, submarine cables have historically been considered military objectives and thereby legitimate targets in times of armed conflict. Arguably, however, this is no longer the case for submarine telecommunications cables, as they serve multiple purposes of which facilitation of military operations is only one. Like in the case of submarine cables, a majority of satellites are owned by non-State actors: SpaceX alone owns over a third of satellites currently in the Earth’s orbit.²⁶⁴ Additionally, in similarity to submarine cables, satellites serve the interest of many non-State, civilian actors. Following the same logic as previously applied to submarine cables, it is therefore not likely that attacks targeting commercial satellites would be considered lawful during armed conflict. Such attacks could potentially have major consequences for neutral States and the civilian communities utilizing the affected satellites, and would not likely be considered proportionate. However, apart from commercial or multi-use satellites, there are also satellites in orbit which are used exclusively for military purposes: the launching of which is connected to a number of considerations, including positioning the space objects with adequate distance to civilian satellites.²⁶⁵ This implies that attacks targeting military satellites would cause less harm to civilians than attacks on commercial satellites. Consequently, a conclusion on proportionality might contrast to the case of commercial satellites. However, as the use of ASATs is connected to a significant increase in space debris, damaging acts targeting military satellites might cause

²⁶¹ Promit Chatterjee. ‘Legality of Anti-Satellites Under the Space Law Regime, *Astropolitics*’. *Astropolitics*. Vol. 12: 2014. p. 27-45. p. 27.

²⁶² Abdul Rehman Khan. ‘Space Wars: Dual-Use Satellites’. *Rutgers Journal of Law and Public Policy*. Vol. 14(3): 2017. p. 314-346. p. 317-318.

²⁶³ Chatterjee. ‘Legality of Anti-Satellites Under the Space Law Regime, *Astropolitics*’. P. 28 & 38.

²⁶⁴ DeweSoft. ‘Every Satellite Orbiting Earth and Who Owns Them’. *DeweSoft*. 2022-01-18. <https://dewesoft.com/daq/every-satellite-orbiting-earth-and-who-owns-them> (Gathered 2022-09-16).

²⁶⁵ Michel Bourbonniere. ‘Law of Armed Conflict (LOAC) and the Neutralisation of Satellites or Ius in Bello Satellitis’. *Journal of Conflict and Security Law*. Vol. 9(1): 2004. p. 43-70. p. 59.

indirect damage to civilian satellites and the environment: Such considerations are also relevant to include in an assessment of proportionality.²⁶⁶

4.4.3. Cyber Crime

Finally, something worth taking into consideration is that, when dealing with digital infrastructure, marauders are not limited to destruction by use of nippers. For instance, the issue of cyber crime can become relevant. Because satellites are controlled by Earth-based technology, hackers can access software without traveling to outer space and both commercial and military-grade satellites are at risk of being targeted by cyber crime.²⁶⁷ However, despite appearing as a threat to infrastructure in outer space, such non-physical attacks might not have to be regulated in international law governing outer space.

While international law applies to cyberspace, it does not provide specific rules on this matter and therefore it is not clear *how* it should be applied.²⁶⁸ In fact, despite the seemingly transnational character of cyber crime, territoriality has proven to be an important factor when allocating jurisdiction over such offenses. The place where the damaging act occurred, the place where the consequence appeared and the location of people and computers involved all constitute factors serving to tie the crime to a certain State.²⁶⁹ Therefore, to the understanding of the author, cyber crime committed on Earth targeting digital infrastructure in areas beyond national jurisdiction would normally be connected to one State's jurisdiction in particular. The situation could therefore be resolved on a national level, using domestic law. Hence, while cyber crime poses a real threat to satellites, the author does not find it necessary to further investigate the issue within the scope of the present thesis.

4.5. Analogical Reasoning from Sea to Outer Space

In *Chapter 3*, the protection of digital infrastructure in areas beyond national jurisdiction in the international law of the sea, the first focal point of this thesis, was analyzed. In contrast, *Chapter 4* examines the second focal point: the international law governing outer space and the challenges faced by digital infrastructure located in this area. Through careful comparison between the law of the sea and the law of outer space, it has become evident that the two areas, in many ways, are similar: both with regard to the general legal context of the law of the sea and the law of outer space, and the practical threats to digital infrastructures located in these areas. Hence, the author concludes that it is appropriate and purposeful to apply

²⁶⁶ Bourbonniere. 'Law of Armed Conflict (LOAC) and the Neutralisation of Satellites or Ius in Bello Satellitis'. p. 66.

²⁶⁷ Archon. 'Cyber Concerns for the Satellite Sector'. *Archon*.

<https://www.archonsecure.com/blog/satellite-cybersecurity> (Gathered 2022-10-07).

²⁶⁸ Duncan Hollis. 'A Brief Primer on International Law and Cyberspace'. *Carnegie endowment for international peace*. 2021-06-14.

<https://carnegieendowment.org/2021/06/14/brief-primer-on-international-law-and-cyberspace-pub-84763> (Gathered 2022-10-07).

²⁶⁹ Susan W. Brenner & Bert-Jaap Koops. 'Approaches to Cybercrime Jurisdiction'. *Journal of High Technology Law*. Vol. 4(1): 2004. p. 1-48.

analogical reasoning, whereby one could draw inspiration from the protection of digital infrastructure in areas beyond national jurisdiction in the law of the sea and apply it in the context of international outer space law.

4.5.1. Flag State Jurisdiction in Relation to Protection of Digital Infrastructure

In the international law of the sea, the provisions explicitly regarding protection of submarine cables assign the responsibility for legislation and enforcement to the flag State of the ship connected to the offense in question. Regarding the role of the flag State, the international law governing outer space applies an approach which resembles the role of the flag State in areas beyond national jurisdiction in international maritime law. Due to the similar perspective on the role of the flag State and comparable nature of challenges faced by digital infrastructure at sea and in outer space, an analogy may be applied. Analogical reasoning suggests that the flag State becomes a central figure for protecting digital infrastructure in international outer space law. Hence, by way of analogical reasoning, the author suggests that the responsibility for legal and practical protection mainly rests with the State of registry of the space object used to injure the structure, for example the flag State of an ASAT weapon. In order to avoid the emergence of a window for damage caused by use of objects other than the space object itself, as is arguably the case in Article 3*bis*(1)(a)(iii) of the 2005 SUA Protocol, the author suggests including not only *use* but also *transportation* of an object used to damage infrastructure. Perhaps, the best way of avoiding unintentional exclusion of certain damaging acts is to copy the formulation in Article 113 of UNCLOS, which refers to “breaking or injury by a ship flying its flag or by a person subject to its jurisdiction”. This could be an effective solution as personnel on board space objects, like persons on a registered ship, are covered by the jurisdiction of the State of registry of the vessel.

Moreover, when drawing inspiration from the protective regime in the law of the sea, it is important to note that the system currently in place is connected to some shortcomings in terms of effective legislation and efficient enforcement. Therefore, in order to create a more watertight protection of digital infrastructure in outer space, it could be useful to utilize the suggested additional protection discussed in the context of the law of the sea. While it is not completely clear whether anti-piracy and anti-terrorism provisions may currently be interpreted to cover crimes targeting submarine cables, it is argued in *Chapter 3* that it would at least not be inappropriate to include such a protection in the context of these regimes, and that provisions on cooperation can serve as relevant sources of inspiration. Because international cooperation has proven to be a solution to insufficient flag State action in the international law of the sea, it is likely that it will have the same effect in the outer space context. Hence, the author holds that, while the main responsibility should remain with the flag State out of respect to its strong position in the outer space context in general, protection of digital infrastructure in international outer space law should include some elements of international cooperation.

4.5.2. International Cooperation: The Piracy Analogy

The treatment of piracy and terrorism in the international law of the sea is akin, yet not quite the same. In both cases, the primary responsibility remains with the flag State while other States have options to act in certain situations. On suspicion of piracy, other States may both board the vessel and arrest and prosecute the pirates without any previous authorization from the flag State.²⁷⁰ If there are suspicions of maritime terrorism encompassed by the 2005 SUA Convention, States other than the flag State do not enjoy the right to visit or hold a suspected ship without previous authorization from the flag State.²⁷¹ Consequently, compared to the anti-piracy order, the flag State has more control over the authority of other States to act against its flag ships in areas beyond national jurisdiction in the anti-terrorism context. Both orders rest on a balance between the interest of State sovereignty – the exclusive jurisdiction of the flag State on the high seas – on one hand, and the interest of efficiently repressing serious offenses which pose a common threat to the international community on the other. In the case of piracy, the effective repression of the crime weighs heavier than the exclusive jurisdiction of the flag State and in the case of terrorism, State control tips the scale. Thus, the relevant question is which order is best suited to inspire future outer space law.

An interesting consideration when answering this question is the similarities between the principles governing outer space and the Area in international law. It would be consistent with the idea that outer space, like the Area, is intended to be used for the greater benefit of mankind, to let the common community interest prevail. Such a solution could draw analogy from the anti-piracy regime, where the common interest of efficiently combating crime affecting the international community as a whole is prioritized over the interest of a State to have its registered vessels operate undisturbed in outer space. At the same time, opening the door to international cooperation on the protection of digital infrastructure in outer space, by drawing inspiration from the considerations applied to the anti-piracy regime, would inevitably entail a limitation of the exclusive jurisdiction of the flag State over its space objects. Because flag State jurisdiction is an expression of State sovereignty, this would likely be controversial.

In international law, and especially in the international law of the sea, the respect for State sovereignty is always important to consider. In fact, compromise between common utilization of the oceans and State sovereignty has formed the zonal approach system. A possible consequence of not adequately taking this interest into consideration when formulating international law is that States refuse to become Parties to the treaty in question. An evident example of this in the law of the sea context is the U.S. not ratifying UNCLOS. Despite being a Party to the 1958 Geneva Conventions on the law of the sea, and having participated actively in the development of UNCLOS, the U.S. chose not to ratify the Convention due to the “unacceptable” elements regarding deep seabed mining: The provisions concerning the

²⁷⁰ *United Nations Convention on the Law of the Sea*. 1982. Articles 110(a) & 105.

²⁷¹ *2005 Protocol to the convention for the suppression of unlawful acts against the safety of maritime navigation*. 2005. Article 8bis.

Area, which were not present in the earlier treaties.²⁷² A central argument against the U.S. ratifying UNCLOS is that such an action could weaken the U.S.' national sovereignty through moving it to international organizations.²⁷³ In relation to deep seabed mining, such an organization would be the Authority.

The law and order of outer space, in similarity to the marine areas beyond national jurisdiction, is heavily dependent on States. Therefore, it is important for the efficient protection of digital infrastructure in outer space that States ratify the treaty containing the relevant provisions. In the context of international outer space law, the U.S. not wanting to become a Party to UNCLOS due to State sovereignty concerns is highly relevant, because the U.S. is a key State in relation to outer space activity. As previously mentioned, it is one of three States currently in possession of a human space programme, and it constitutes a base for central non-State companies in the outer space business, most importantly SpaceX. As of January 2022, there were a number of 2 804 U.S.-flagged satellites in orbit, compared to China's 467 satellites and Russia's 168.²⁷⁴ Therefore, when attempting to create an efficient protection for digital infrastructure in outer space, it is essential to have the U.S. on board. Taking this into consideration, a more suitable alternative would perhaps be to draw inspiration from the anti-terrorism regime, whereby the flag State enjoys more control over State activity directed at its registered ships.

4.5.3. International Cooperation: The Terrorism Analogy

Basing the additional protective mechanisms for digital infrastructure in outer space on the essence of the SUA Convention and its 2005 Protocol would enable States other than the flag State to intervene, but only after authorization from the flag State. Drawing analogies from the international anti-terrorism legislation in the international law of the sea can also be supported by the connection between States and digital infrastructure in outer space. When the Nord Stream pipeline was (allegedly) attacked in the exclusive economic zones of Denmark and Sweden, leaders were quick to rule out the possibility of the attack being directed at any of those States, due to the location of the leak. Another reason for this conclusion was that none of the States owned the pipeline in question.²⁷⁵ While it is common for non-State actors to finance and own both submarine cables and satellites, there is an interesting difference in registration of these structures. As previously noted, registration is of

²⁷² Ronald Reagan. 'Statement on United States Actions Concerning the Conference on the Law of the Sea'. *National Archives*. 1982-07-09.
<https://www.reaganlibrary.gov/archives/speech/statement-united-states-actions-concerning-conference-law-sea> (Gathered 2022-10-10).

²⁷³ Robert Beckman. 'On the United States, the UN Convention on the Law of the Sea and US Freedom of Navigation Operations'. *Fulcrum*. 2022-08-05.
<https://fulcrum.sg/on-the-united-states-the-un-convention-on-the-law-of-the-sea-and-us-freedom-of-navigaion-operations/> (Gathered 2022-10-10).

²⁷⁴ DeweSoft. 'Every Satellite Orbiting Earth and Who Owns Them'. *DeweSoft*. 2022-01-18.
<https://dewesoft.com/daq/every-satellite-orbiting-earth-and-who-owns-them> (Gathered 2022-09-16).

²⁷⁵ Sveriges Radio. 'Magdalena Andersson: Nord Stream leaks most likely sabotage'. ; Xinhua. 'Danish PM: Nord Stream pipeline leaks "deliberate actions"'.
<https://www.sverigesradio.se/artiklar/magdalena-andersson-nord-stream-leaks-most-likely-sabotage>

central importance in the international law of the sea and the international law of outer space, as it connects vessels located in areas beyond national jurisdiction to a State. Even so, registration of digital infrastructure differs between the fields: While satellites themselves are registered as space objects, submarine cables are not registered at all. Hence, even if digital infrastructure in space is *owned* by a non-State company, there is a clear connection between the structure and its State of registry. For example, when SpaceX launches satellites into space, those satellites are U.S. flagged, but when Google installs a submarine cable, that cable is Google flagged.

Because satellites, in contrast to submarine cables, are registered with specific States, there is arguably a stronger link between a State and digital infrastructure in outer space than between a State and digital infrastructure at sea. Consequently, it also appears more likely that an attack on digital infrastructure in outer space would be considered an attack on the State of registry, and thereby politically motivated. This resonates with the formulation of the 2005 SUA Protocol, which concerns, *inter alia*, acts intended to “compel a government or an international organization to do or to abstain from doing any act”.²⁷⁶ Moreover, the 2005 SUA Protocol refers to damage accomplished through “using” a ship, something which in doctrine has been interpreted as using the ship itself as a weapon. Hence, protecting property from damage caused through use of a ship in the law of the sea would not be too different from regulating the use of ASAT weapons to destroy satellites. When reasoning by analogy from Article 3*bis*(1)(a)(iii) of the 2005 SUA Protocol, it is important to note that the provision only encompasses *intentional* offenses, which would be suitable to regulate the launching of ASAT weapons but not damage caused through collisions with space debris. It would not be true to the scope and purpose of either the anti-piracy or the anti-terrorism regime to include damage caused through culpable negligence and, therefore, the author suggests that the regulation of such offenses remains within the exclusive jurisdiction of the flag State. Nonetheless, considering the increasing issue of space debris, the author encourages both international dialogue on the matter and an attempt to allocate responsibility for accidents.

4.5.4. Clarifications on the Status of Digital Infrastructure During Armed Conflict

Lastly, regarding the topic of armed conflict, it would be helpful to clarify in international law whether digital infrastructure located in outer space are military objectives or not, and if there are any circumstances which might change their status. It is likely that an attack on multi-use, commercial satellites would not be considered proportionate in the current milieu, due to the potential spill-over effects on neutral States and civilians. However, as satellites, in contrast to submarine cables, are somewhat separated based on use (e.g. commercial and military grade) it might be deemed lawful to target and attack military grade satellites under certain circumstances.

²⁷⁶ 2005 Protocol to the convention for the suppression of unlawful acts against the safety of maritime navigation. 2005. Article 3*bis*(1)(a)(iii).

4.6. Institutional Aspects

It has now been concluded that, in theory, international outer space law could draw inspiration from the international law of the sea, with regard to the protection of digital infrastructure in areas beyond national jurisdiction. Which material elements to include has also been crystallised and motivated. In practice, however, it is a challenging task to bring an idea *de lege ferenda* from theory into reality. This matter is briefly analyzed in the following.

4.6.1. The Stagnation of International Law-Making

Since the millennium shift, there has been a clear trend in international law-making of not developing treaties and other legally binding instruments on a multilateral level, but rather to produce non-binding *soft law* like recommendations, guidelines and resolutions. At present, this trend is followed by central institutions involved in international law-making: The United Nations General Assembly, in particular its sixth committee, is the central forum for adoption of multilateral treaties but, at the moment, it mainly produces soft law.²⁷⁷ Conformingly, the International Law Commission, which is responsible for promoting the development and codification of international law,²⁷⁸ is currently recommending conversion of its work into soft law rather than binding legal instruments. In a similar manner, the law-making process of international law governing outer space has stagnated: The United Nations Committee on the Peaceful Uses of Outer Space (COPUOS), which is a subsidiary committee to the General Assembly and has developed the current international treaties on outer space, has not produced any binding instruments since the 1979 *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*. Even on the matter of space debris, which was granted priority status by the General Assembly in 1993, the COPUOS has failed to develop a treaty and has instead adopted a set of guidelines.²⁷⁹

Following the same trend, the international community struggles to regulate threats posed by digital technologies, such as cyber crime. One challenge is that the development of multilateral treaties is a lengthy process while technology is developed at a fast pace. Another challenge is that multilateral forums tend to apply a State centered approach, meanwhile technological development is at large controlled by the private sector. Consequently, with regard to cyber crime and digital warfare, it has been argued that despite historically regulating different measures and means of warfare, the capability of multilateral forums to handle “armed conflict in the digital age” is questionable. In an article on the topic, Ambassador Amandeep S. Gill argues that the development of international rules in this area of law would benefit from a change of focus, from the traditional treaty development to a

²⁷⁷ Andreas Motzfeldt Kravik. 'An analysis of stagnation in multilateral law-making – and why the law of the sea has transcended the stagnation trend'. *Leiden Journal of International Law*. Vol. 34: 2021. p. 935–956. p. 944-947.

²⁷⁸ United Nations. 'International Law and Justice'. *United Nations*.

<https://www.un.org/en/global-issues/international-law-and-justice> (Gathered 2022-11-01).

²⁷⁹ Motzfeldt Kravik. 'An analysis of stagnation in multilateral law-making – and why the law of the sea has transcended the stagnation trend'. p. 943-947.

more flexible multi-sector and multi-instrumental approach: a "flexible palette of legal, political and technical norms".²⁸⁰ He argues that the private sector should be more involved and that law-making should be developed parallel to the evolution of the technology it is aimed to regulate.²⁸¹ While the protection of digital infrastructure in outer space is not synonymous with regulation of digital warfare, it is certainly a related area of law, as it is characterized by technical development and significant private sector engagement. Additionally, digital warfare is a potential threat to digital communications technology in the modern age. Therefore, it is likely that law-making concerning outer space matters, like the protection of digital infrastructure in outer space, could also benefit from higher involvement of the private sector and development of different legal instruments in order to keep the law-making process parallel to technological development: Where treaties cannot be created in the traditional sense, perhaps the international community should resort to alternative solutions.

The reason for the current stagnation in development of multilateral treaties can be explained by multiple factors: For instance that great State powers are generally skeptical towards development of new international rules, or that they oppose legal developments which might benefit non-allied States. Another reason is a collective disinterest from States to develop new international rules in a certain area of law. In legal doctrine, it is argued that the main reason behind the trend is the "continuing inability or unwillingness of traditional great powers to negotiate new binding norms".²⁸² It is suggested that this approach is rooted in geopolitical shifts, whereby traditionally stronger States are experiencing a decline in their international influence, as traditionally less influential States grow larger and stronger. With this shifting power balance, it is no longer an uncomplicated task to develop international law reflecting primarily perspectives and policies of formerly great powers and their allies. This might be an explanation to the U.S., and other States previously active in development of legally binding multilateral instruments, adopting a more cautious approach to such developments in the last decades. Finally, a practical explanation to the stagnation is the adoption of a *strict consensus principle* by the General Assembly and its subsidiaries: Disagreement between State Parties creates a significant hindrance for multilateral treaties to be concluded under the auspices of the sixth committee. On occasion, for instance in the area of international humanitarian law, treaties are concluded without the involvement of key States opposing the development. While this strategy results in binding international law, the impact of such instruments becomes significantly limited when key actors are counted out of the equation.²⁸³

²⁸⁰ Amandeep S. Gill. 'The changing role of multilateral forums in regulating armed conflict in the digital age'. *International Review of the Red Cross*. Vol. 102(913): 2020. p. 261-285. p. 282.

²⁸¹ Gill. 'The changing role of multilateral forums in regulating armed conflict in the digital age'. *International Review of the Red Cross*. Vol. 102(913): 2020. p. 261-285. p. 285.

²⁸² Motzfeldt Kravik. 'An analysis of stagnation in multilateral law-making – and why the law of the sea has transcended the stagnation trend'. p. 956.

²⁸³ Motzfeldt Kravik. 'An analysis of stagnation in multilateral law-making – and why the law of the sea has transcended the stagnation trend'. p. 944-956.

4.6.2. The U.S. Perspective on International Law-Making and Outer Space Law

While having expressed interest in developing a framework intended to support economic developments in outer space,²⁸⁴ the U.S. has, for years, generally opposed additions to current international law governing outer space. The 2006 U.S. national space policy stipulates that the State “will oppose the development of new legal regimes or other restrictions that seek to prohibit or limit U.S. access to or use of space”.²⁸⁵ This choice of wording echoes the concerns presented by the U.S. in the law of the sea context regarding the Area. On the same note: In doctrine, the common heritage principle has been used as one of the main arguments for the U.S. not becoming a Party to the *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*.²⁸⁶

The U.S. approach of general unwillingness towards development of new binding legal instruments in outer space law has been described as an indication that “the obstacles to new treaties in this area seem insurmountable” in the near future.²⁸⁷ Nonetheless, while it remains clear that the U.S. considers itself a pioneer and leader for the international community on its voyage into outer space, its 2021 *Space Priorities Framework* presents no clear opposition towards development of binding legal instruments in the area of international outer space law. Instead, it is stated therein that the U.S. “will engage the international community to uphold and strengthen a *rules-based* international order for space”.²⁸⁸ This suggests that, while the U.S. historically has adopted a skeptical approach towards legal provisions based on the common heritage of mankind doctrine, which undoubtedly is a part of outer space law, it might not have closed the door on developing new binding international rules on outer space activities altogether.

In this context, it should be noted that the term “rules-based international order” (rather than “international law”) is part of a larger rhetorical shift in the international community, and that the U.S. appears to associate the formulation with U.S. leadership. It has been suggested in legal doctrine that, like the overall trend in international law-making, the rhetorical shift might stem from a changing power distribution within the international community whereby it has become increasingly difficult for the U.S. and its allies to “achieve new multilateral treaties” and to “lead the creation of treaty regimes that reflect policy choices”.²⁸⁹ Consequently, perhaps the use of this particular wording in the *Space Priorities Framework* should be understood as the U.S. being open to developing new binding multilateral

²⁸⁴ Weinzierl & Mehak Sarang. ‘The Commercial Space Age Is Here’.

²⁸⁵ EROS History Project. ‘2006 National Space Policy’. USGS. 2019-10-09.

<https://www.usgs.gov/media/files/2006-national-space-policy> (Gathered 2022-11-01).

²⁸⁶ Stanley B. Rosenfield. ‘The Moon Treaty: The United States Should Not Become a Party’. *American Society of International Law Proceedings*. Vol. 74: 1980. p. 162-166.

²⁸⁷ Motzfeldt Kravik. ‘An analysis of stagnation in multilateral law-making – and why the law of the sea has transcended the stagnation trend’. p. 952.

²⁸⁸ **Emphasis added.** The White House. *United States Space Priorities Framework*. 2021-12. p. 7.

²⁸⁹ Shirley V. Scott. ‘The Decline of International Law as a Normative Ideal’. *Victoria University of Wellington Law Review*. Vol. 49(4): 2018-11. p. 627-644. p. 637-640.

instruments concerning international outer space law, provided that the U.S. may lead or heavily influence such developments.

In the 2000s and 2010s, Russia and China attempted to create a multilateral treaty, the *PPWT*, concerning weapons in outer space and use of force against space objects located in outer space. The treaty is currently not in force and has been contested by both the EU and the U.S.²⁹⁰ The U.S. was not at all persuaded by the *PPWT*: In fact, in 2014, U.S. Ambassador Robert Wood explained that the U.S. considers the treaty “fundamentally flawed”. He also held that it had an unsatisfactory scope, as he criticized the fact that the *PPWT* does not address the pressing threat of ASAT weapons located on Earth. He emphasized, however, that the U.S. “is willing to consider space arms control proposals and concepts that are equitable, effectively verifiable, and enhance the security of all nations”.²⁹¹

Because the U.S. is one of the central States engaging in space activity and has significant impact on outer space law, a multilateral treaty concluded without involvement of the U.S. would risk becoming merely symbolic, not having any noticeable consequences in practice. If the U.S., as a key outer space State, would completely oppose legal development in outer space law, or specifically the protection of digital infrastructure in outer space, the efficient implementation of such rules would be undermined. This, however, does not appear to be the current U.S. approach: The government does not seem to be opposed to regulation of the use of force in outer space in general, but to the proposed framework (*PPWT*) in particular.

It should be emphasized that, as a key player in outer space, it is in the interest of the U.S. to efficiently protect its registered space objects and to regulate space activities, somehow. Other States, like Luxembourg, Japan and the UAE, have taken steps towards establishing frameworks regarding rights to resources mined in outer space,²⁹² a matter which will likely become increasingly relevant alongside new developments in the outer space field. As the U.S. has expressed interest in developing frameworks on economic aspects of space activity, perhaps there is a future for joint regulations on such matters. Is there, however, a future for multilateral agreements on protection of digital infrastructure in outer space?

4.6.3. The Law of the Sea Does Not Follow the Trend

While the overall trend in international law-making in the 21st century is the development of soft law instruments, the law of the sea continues to respond to challenges and shortcomings by creating multilateral treaties. Soft law is created also in the law of the sea context. However, in contrast to other areas of international law, soft law is not the result of

²⁹⁰ Motzfeldt Kravik. ‘An analysis of stagnation in multilateral law-making – and why the law of the sea has transcended the stagnation trend’. p. 944.

²⁹¹ Jeff Foust. ‘U.S. Dismisses Space Weapons Treaty Proposal As “Fundamentally Flawed”’. *SpaceNews*. 2014-09-11.

<https://spacenews.com/41842us-dismisses-space-weapons-treaty-proposal-as-fundamentally-flawed/> (Gathered 2022-11-02).

²⁹² Matthew Weinzierl & Mehak Sarang. ‘The Commercial Space Age Is Here’.

compromise between States failing to agree on binding rules but rather a helpful milestone in developing hard law. There are several possible explanations for this unique success in continuous creation of binding instruments after the millennium shift: One being the use of majority-based decision making rather than strict consensus and another being the evened-out power balance between traditionally more and less influential States, a result of the introduction of the zonal system. Finally, the law of the sea is wide in reach and scope, which implies broad application and harmonization of elemental rules and principles in the field. Therefore, when conflicts arise in the law of the sea context, it is usually within the frames of the system.²⁹³

The author holds that, in this sense, the law of the sea and the law of outer space are different and, hence, that the same results cannot be expected from law-making in these two areas. An important difference is the zonal system: In the law of the sea, the zonal approach gives traditionally less influential States an interesting leverage in negotiations. For example, a small coastal State can claim a territorial sea and exclusive economic zone (potentially housing valuable resources) of the same breadth as a traditionally stronger coastal States. Therefore, treaties concluded without involvement of traditionally influential States can still result in wide geographical application. Moreover, there are examples of collectives of smaller States with similar interests successfully working against the will of larger States in negotiations. The zonal system and its effects cannot be transferred into the outer space context, because no part of outer space falls within the sovereignty of States and therefore there can be no geographical zones subject to national jurisdiction. Additionally, while the law of the sea is extensive enough to create a common understanding of basic concepts internationally, the law of outer space is more fragmented and quite general in scope. Therefore, in the outer space context, it is more likely that States have fundamentally different perspectives and experience difficulties in agreeing on a joint way forward. Finally, the COPUOS has previously worked on the basis of consensus.²⁹⁴ Therefore, the benefits of majority decisions in the law of the sea cannot easily be expected from law-making concerning outer space matters.

Due to the now presented differences, the author concludes that the most valuable piece of inspiration law-making in the outer space context could draw from law-making regarding the law of the sea, is the use of soft law as a way of streamlining the development of binding legal instruments on a multilateral level. Not only could this be a step in the direction of developing a treaty on the matter, but over time there is also a possibility of evolution into customary law binding to all States. Moreover, as technological progress has caught speed and the development of binding international instruments is not only a lengthy process, but a difficult one, the author argues that the most realistic goal in the present international law-making climate is to create soft law instruments on the matter.

²⁹³ Motzfeldt Kravik. 'An analysis of stagnation in multilateral law-making – and why the law of the sea has transcended the stagnation trend'. p. 947-951.

²⁹⁴ Motzfeldt Kravik. 'An analysis of stagnation in multilateral law-making – and why the law of the sea has transcended the stagnation trend'. p. 943.

4.6.4. Involving Non-State Actors in the Development of Soft Law Instruments

With regard to development of soft law, the author finds it important to consider the central role of private actors in the outer space field. As is the case with submarine telecommunications cables, non-State companies are key actors in financing and developing digital infrastructure in outer space, as well as facilitating various space activities. Therefore, their expertise and interests are relevant, if not essential, to consider when developing frameworks governing outer space activities. A treaty not properly taking such interests into account might discourage further investments in the satellite sector, and thereby slow down developments. Non-State actors cannot develop binding legal instruments but a soft law solution, taking current visions and challenges into account, could be an efficient way of approaching the issue. The author therefore stands by the above conclusion that formulation of soft law on the matter is an appropriate first step in developing a protective framework for digital communications infrastructure in outer space. The author's view is that a realistic way of creating such a framework in the current milieu would be to significantly include the private sector in the law-making process.

In this context, the author wants to emphasize that outer space is intended to be used for facilitation of common interests of mankind. Consequently, there might be concerns regarding significant involvement of private companies in the development of a protective framework, as such actors are generally fueled primarily by the interest of profit. Moreover, in contrast to State actors, private companies are not put in a position of power through democratic elections. Nonetheless, the worldwide reliance on telecommunications services (such as internet connection) and current developments in the outer space field must be taken into account. Considering these factors, the author argues that a framework protecting digital infrastructure providing communications services from outer space would not only be in the interest of private companies providing those services, but also in the interest of mankind.

Chapter 5. Conclusion

Digital infrastructures facilitating communications services are essential for the proper functioning of modern society. Like other types of infrastructure, these structures become invisible to frequent users as the functions they provide are taken for granted. Hence, digital infrastructures, such as submarine cables and satellites, are silently enabling a large number of tasks in different sectors every day. Nonetheless, when significant damage causes a disruption in their functions, the structures are revealed to users: It becomes evident that modern society is significantly reliant on digital infrastructure in all areas from working, studying and efficient communications, to banking and national security. At the same time, these structures are fragile and constantly at risk of being injured through accidents caused by anchoring or fishing equipment, natural phenomena, collisions with debris and different types of intentional attacks. Despite the proper functioning of digital infrastructures clearly being indispensable to modern society, the legal regimes governing these types of structures are not considered a priority by the international community. For instance, submarine cables are currently used to transport close to all digital communications in the World, but the international regime encompassing these structures is often referred to as a "neglected area" of law.²⁹⁵

In the international law of the sea, there are provisions in place aiming to protect submarine cables. With regard to submarine cables located in areas beyond national jurisdiction, States are obliged to make the act of damaging submarine cables, intentionally or through culpable negligence, a punishable offense. As this has shown not to be a watertight solution in terms of neither legislation nor enforcement, some scholars have suggested strengthening the protection through resorting to interpretation of provisions enabling international cooperation on matters of maritime security (mechanisms regarding piracy and terrorism at sea). Interpreting current international rules on anti-piracy and anti-terrorism to encompass offenses targeting submarine cables in areas beyond national jurisdiction, would extend competences beyond the exclusive jurisdiction of the flag State and thereby make intervention from other States possible. This could be a particularly useful tool in cases where the responsible flag State is incapable or unwilling to adequately address these offenses. Importantly, however, there is no consensus on whether these provisions are currently applicable to offenses targeting submarine cables or not. The author argues that, regardless of the current applicability in maritime law, the principles and considerations enshrined in the anti-piracy and anti-terrorism regimes are interesting to consider when discussing the development of a new protective order for digital infrastructure in the international law governing outer space.

Although the efficiency of the protection of submarine cables in areas beyond national jurisdiction has been questioned, there is at least some kind of protection of digital

²⁹⁵ Holly Elizabeth Matley. 'Closing the gaps in the regulation of submarine cables: lessons from the Australian experience'. *Australian Journal of Maritime & Ocean Affairs*. Vol. 11(3): 2019. p. 165-184. p. 166.

infrastructure in the international law of the sea. In contrast, there is no corresponding regime protecting satellites in orbit under the international law governing outer space. Satellites used for communications services have similar functions to submarine cables and although the practical threats of injury faced by satellites and submarine cables differ, there is a chief similarity in that most of the threats are connected to human interference: At sea, it can be a question of anchoring incidents or cable cutting, and in outer space it can take the shape of collisions with space debris or attacks using ASAT weapons. At large, also the wider context of the international law of the sea and the international law of outer space, in which these digital infrastructures exist, are similar. The international law governing outer space is, while not exclusively so, heavily inspired by international maritime law: This becomes evident when observing the many similarities between outer space and the principles governing areas beyond national jurisdiction in the international law of the sea. There are also differences between these two areas of law, but none which the author considers significant enough to hinder reasoning by analogy in the present case. Therefore, in *Chapter 4*, analogy is drawn from the first focal area of the thesis (the international law of the sea) and applied to the second focal area (the international law of outer space), creating a point of connection under the bifocal approach. The reasoning by analogy results in the crystallization of key elements which are relevant to consider when developing future legislation on the protection of digital infrastructure in outer space. On this matter, the following is concluded:

With respect to the present order of flag State jurisdiction in outer space, and the fact that the flag State has a central role in the protection of digital infrastructure at sea, the author suggests that the main responsibility regarding protecting digital infrastructure in outer space is assigned to the flag State. Considering the critique against the current order in the international law of the sea, and the arguments for and against strengthening that protection using legislation enabling international cooperation, the author suggests that the protection of digital infrastructure in outer space includes a provision enabling international cooperation on the matter, to some extent. However, keeping in mind on one hand the significance of respecting State sovereignty in international law, and on the other hand the importance of including major space faring nations like the U.S. for the efficiency of the protection of digital infrastructure in outer space, the author proposes that the flag State remains in control over the interference from other States towards its registered space objects. More specifically, by analogy from the anti-terrorism regime in the international law of the sea, the suggestion is the introduction of a threshold for cooperation mechanism taking the shape of flag State authorization. Finally, aware that the international law of outer space was developed in a time of concern for war in outer space, and that there are currently functional ASAT weapons on Earth, the author encourages clarification on whether digital infrastructure in outer space are lawful targets during armed conflict or not and, if so, under what circumstances.

Additionally, it should be noted that the practical implementation of these material elements cannot be taken for granted in the present international law-making climate, where few binding legal instruments are concluded on a multilateral level. The U.S., which is a key actor in the outer space context and therefore relevant to take into account, has not entirely closed the door on creating new international rules on outer space matters, but is generally hesitant

to develop new multilateral treaties. This could be explained through a shift in international power dynamics over the past decades, which has resulted in a decreased amount of influence on international law-making for the U.S. and its allies. On the matter of effective implementation, the author argues that law-making concerning the law of outer space should, when possible, draw inspiration from the law of the sea context: More specifically, the author holds that the most realistic way of implementing the material elements suggested, in the context of the current law-making climate, is to develop soft law instruments. In a climate where States struggle to agree on binding rules, such materials could compile common ideas and serve as a point of departure for creation of subsequent binding multilateral instruments. The conclusion of a multilateral treaty excluding the U.S. would likely not have significant practical effects, because the U.S. is such a central actor in the outer space context. Additionally, the author suggests that non-State actors, which are essential to current progress in the outer space field, should be involved in the development of a framework concerning the protection of digital communications infrastructure in outer space. Finally, it is emphasized that the international community has intended for all space activities to be conducted in the interest of mankind and that this therefore should be taken into account also when creating soft law on the matter.

As has been clear from the development of the law of the sea, international security legislation tends to be reactive rather than proactive: For instance, the 1988 SUA Convention was created as a reaction to the Achille Lauro incident and amended as a reaction to the 9/11 terrorist attacks. Even so, despite the occurrence of intentional crime targeting critical infrastructure at sea, space debris destroying digital infrastructure in outer space and satellite destruction weapons being successfully tested, there seems to be no strong reactions from the international community. When the Nord Stream pipeline started leaking, politicians were not late to call it an attack, but they were likewise quick to disregard it as an attack not concerning their particular States. The author of this thesis strongly argues that an attack on critical infrastructures used commonly by multiple States, *is* a concern of the international community even when it occurs in an area beyond national jurisdiction: both with regard to practical reasons of protecting their functions and to legal and political reasons of repressing terrorism and other crimes of international concern. It is difficult to organize a conference during an internet blackout: The discussion on protection of critical digital communications infrastructures in areas beyond national jurisdiction should start now, not wait to be preceded by disaster.

List of References

Legal Materials

- Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*, New York, 5 December 1979. UNTS Vol. 1363, p. 3.
- Convention for the Protection of Submarine Telegraph Cables*, Paris, 14 March 1884. Australian Treaty Series Vol. 1901 (1).
- Convention for the Suppression of Unlawful Acts Against the Safety of Maritime Navigation*, Rome, 10 March 1988. UNTS Vol. 1678, p. 221.
- Convention on the High Seas*, Geneva, 29 April 1958. UNTS Vol. 450, p. 11.
- Convention on International Liability for Damage Caused by Space Objects*, London, Moscow, Washington, 29 March 1972. UNTS Vol. 961, p. 187.
- Convention on Registration of Objects Launched into Outer Space*, New York, 12 November 1974. UNTS Vol. 1023, p. 15.
- General Assembly Resolution XVIII. *Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space*. A/RES/18/1962, 13 December 1963.
- General Assembly Resolution 3067 (XXVIII), 16 November 1973.
- General Assembly Resolution 65/37, *Oceans and the law of the sea*, A/RES/65/37, 7 December 2010.
- International Maritime Organization (IMO), *Protocol of 2005 to the Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation*, 14 October 2005.
- Protocol for the Suppression of Unlawful Acts against the Safety of Fixed Platforms Located on the Continental Shelf*, 10 March 1988. UNTS Vol. 1678, p. 304.
- United Nations Convention on the Law of the Sea*, Montego Bay, 10 December 1982. UNTS Vol. 1833, p. 3.
- Statute of the International Court of Justice*. San Francisco, 24 October 1946.
- Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*, London, Moscow, Washington, 27 January 1967.
- The M/V Saiga (No.2) case (Saint Vincent and the Grenadines v Guinea), ITLOS Judgment 1999.
- Vienna Convention on the Law of Treaties*, Vienna, 23 May 1969. UNTS Vol. 1155, p. 331.

Printed Sources

- Anyanova, Ekaterina. 'Oceans apart: overview of the international law regime for submarine cables'. *International Journal of Private Law*. Vol. 4(1): 2011. p. 100-110.
- Aricò, Salvatore (ed.). *Ocean Sustainability in the 21st Century*. Cambridge University Press. 2015-05. p. 270-271.
- Bielicki, Damian M. 'Legal Aspects of Satellite Constellations'. *Air and space law*. Vol. 45(3): 2020. p. 245-264.
- Bourbonniere, Michel. 'Law of Armed Conflict (LOAC) and the Neutralisation of Satellites or Ius in Bello Satellitis'. *Journal of Conflict and Security Law*. Vol. 9(1): 2004. p. 43-70.
- Bueger, Christian; Liebetau Tobias & Franken Jonas. *Security threats to undersea*

- communications cables and infrastructure – consequences for the EU*. Policy Department for External Relations Directorate General for External Policies of the Union, 2022-06.
- Carter, Lionel; Burnett, Douglas; Drew, Stephen; Marle, Graham; Hagadorn, Lonnie; Bartlett-McNeil, Deborah & Irvine, Nigel. *Submarine cables and the oceans: connecting the world*. UNEP-WCMC Biodiversity Series No. 31, 2009.
- Chatterjee, Promit. 'Legality of Anti-Satellites Under the Space Law Regime, Astropolitics'. *Astropolitics*. Vol. 12: 2014. p. 27-45.
- Gasser, Hans-Peter. 'Prohibition of terrorist acts in international humanitarian law'. *Cambridge University Press: International Review of the Red Cross*. Vol. 26(253): 1986. p. 200-212.
- Gill, Amandeep S. . 'The changing role of multilateral forums in regulating armed conflict in the digital age'. *International Review of the Red Cross*. Vol. 102(913): 2020. p. 261-285.
- Grotius, Hugo. Van Deman Magoffin, Ralph (tr). 'The Freedom of the Seas'. Original title: *Mare Liberum*. First published 1609.
- Guilfoyle, Douglas; Paige, Ramsin Phillipa & McLaughlin, Rob. 'THE FINAL FRONTIER OF CYBERSPACE: THE SEABED BEYOND NATIONAL JURISDICTION AND THE PROTECTION OF SUBMARINE CABLES'. *The International and comparative law quarterly*. Vol. 71 (3). p.657-696.
- Hart Dubner, Barry & Greene, Karen. 'On the Creation of a New Legal Regime to Try Sea Pirates'. *Journal of Maritime Law and Commerce*. Vol. 41(3): 2010-07. p. 439-464.
- Harrington, Caitlin A. 'Heightened Security: The Need to Incorporate Article 3BIS(1)(A) and 8BIS(5)(E) of the 2005 Draft Sua Protocol into Part VII of the United Nations Convention on the Law of the Sea'. *Pacific Rim Law & Policy Journal*. Vol 16(1): 2007. p. 107-136.
- Hellner, Jan. 'Argumentation de lege ferenda', *Svensk Juristtidning*. 1975: p. 401-420.
- IMO. 'Status of multilateral Conventions and instruments in respect of which the International Maritime Organization or its Secretary-General performs depositary or other functions'. *IMO*. 2017-07-11.
- International Law Commission. *Report of the International Law Commission on the work of its sixty-fifth session*. 2013.
- International Law Commission. *Yearbook of the International Law Commission 1950 Volume II*. New York: United Nations: 1957.
- International Law Commission. 'Report of the International Law Commission on the Work of its Eighth Session'. *Official Records of the General Assembly*. 4 July 1956.
- Iovane, Massimo (ed.); M. Palombino, Fulvio (ed.); Amoroso, Daniele (ed.) & Zarra, Giovanni (ed.). *The Protection of General Interests in Contemporary International Law: A Theoretical and Empirical Inquiry*. Oxford: Oxford University Press. 2021.
- Jovic, Jelena; Pantovic-Stefanovic, Maja; Mitkovic-Voncina, Marija; Dunjic-Kostic, Bojana; Mihajlovic, Goran; Milovanovic, Srdjan; Ivkovic, Maja; Fiorillo, Andrea & Latas, Milan. 'Internet use during coronavirus disease of 2019 pandemic: Psychiatric history and sociodemographics as predictors'. *Indian Journal of Psychiatry*. Vol. 62 (9): 2020-09-28. p. 383-390.
- Kaye, Stuart. 'International measures to protect oil platforms, pipelines, and submarine cables from attack'. *Tulane Maritime Law Journal*. Vol. 31(2), 2007: p. 377-424.
- Keupp, Marcus Matthias (ed.). *The Security of Critical Infrastructures: Risk, Resilience and Defense*. Cham: Springer International Publishing AG. 2020.
- Ku, Charlotte. 'The concept of res communis in international law'. *History of European Ideas*. 1990. Vol. 12(14), 1990: p. 459-477.

- Laver, Michael. 'Public, Private and Common in Outer Space: *Res Extra Commercium* or *Res Communis Humanitatis* beyond the High Frontier?'. *Political Studies*. Vol. 34(3): 1986. p. 359-373.
- Leigh Star, Susan & C. Bowker, Geoffrey. 'How to Infrastructure' in *The Handbook of New Media*. London: SAGE Publications. 2006.
- Li, K.X & Wonham. 'New Developments in Ship Registration'. *International Journal of Marine and Coastal Law*. Vol. 14(1): 1999. p. 137-154.
- Liao, Xuexia. 'Protection of Submarine Cables against Acts of Terrorism'. *Ocean Yearbook*. Vol. 33: 2019. p. 456-486.
- Loong Hantover, Lixian. 'The Cloud and the Deep Sea: How Cloud Storage Raises the Stakes for Undersea Cable Security and Liability'. *Ocean and Coastal Law Journal*. Vol. 19(1), 2013: p. 1-28.
- MacDonald, Scott D. 'The SUA 2005 Protocol: A Critical Reflection'. *International Journal of Marine and Coastal Law*. Vol. 28(3): 2013. p. 485-516.
- Matley, Holly Elizabeth. 'Closing the gaps in the regulation of submarine cables: lessons from the Australian experience'. *Australian Journal of Maritime & Ocean Affairs*. Vol. 11(3): 2019. p. 165-184.
- McLaughlin, Rob; Paige, Tamsin Phillipa & Guilfoyle, Douglas. 'Submarine Communication Cables and the Law of Armed Conflict: Some Enduring Uncertainties, and Some Proposals, as to Characterization'. *Journal of Conflict & Security Law*. 2022-04-21. p. 1-42.
- McLeod, Walton J. 'The Flags-of-Convenience Problem'. *South Carolina Law Review*. Vol. 16(3): 1964. p. 409-418.
- Motzfeldt Kravik, Andreas. 'An analysis of stagnation in multilateral law-making – and why the law of the sea has transcended the stagnation trend'. *Leiden Journal of International Law*. Vol. 34: 2021. p. 935-956.
- Mukherjee, Proshanto K. & Brownrigg, Mark. *Farthing on International Shipping*. 4 ed. Springer-Verlag Berlin Heidelberg, 2013.
- O'Malley, Sean. 'Vulnerability of South Korea's Undersea Cable Communications Infrastructure: A Geopolitical Perspective'. *Korea Observer*. 2019, Vol. 50(3): 2019. p. 309-330.
- Organization for Security and Co-operation in Europe. 'Status of the Universal Anti-Terrorism Conventions and Protocols as well as other International and Regional Legal Instruments related to Terrorism and Co-operation in Criminal Matters in the OSCE Area'. *Organization for Security and Co-operation in Europe*. 2018-01.
- Paige, Tamsin. 'Piracy and Universal Jurisdiction'. *Macquarie Law Journal*. Vol. 12: 2013. p. 131-154.
- Peppetti, Jon D. 'Building the Global Maritime Security Network: A Multinational Legal Structure to Combat Transnational Threats'. *Naval Law Review*. Vol. 55: 2008. p. 73-156.
- Peterson, MJ. 'The Use of Analogies in Developing Outer Space Law'. *The MIT Press*. Vol. 51(2): 1997. p. 245-274.
- Rehman Khan, Abdul. 'Space Wars: Dual-Use Satellites'. *Rutgers Journal of Law and Public Policy*. Vol. 14(3): 2017. p. 314-346.
- Rosenfield, Stanley B. 'The Moon Treaty: The United States Should Not Become a Party'. *American Society of International Law Proceedings*. Vol. 74: 1980. p. 162-166.
- Scanlon, Zoe. 'Addressing the Pitfalls of Exclusive Flag State Jurisdiction: Improving the Legal Regime for the Protection of Submarine Cables'. *Journal of Maritime Law and Commerce*. Vol. 48(3): 2017. p. 295-340.

- Scott, Shirley V. 'The Decline of International Law as a Normative Ideal'. *Victoria University of Wellington Law Review*. Vol. 49(4): 2018-11. p. 627-644.
- Sechrist, Michael. 'Cyberspace in Deep Water: Protecting the Arteries of the Internet'. *Kennedy School Review*. Vol.10: 2010. p. 40-44.
- Sicking, Louis. 'God's Friend, the Whole World's Enemy: Reconsidering the Role of Piracy in the Development of Universal Jurisdiction'. *Netherlands Journal of Legal Philosophy*. Vol. 47(2): 2018. p. 176-186.
- Sivakumaran, Sandesh. 'Techniques in International Law-Making: Extrapolation, Analogy, Form and the Emergence of an International Law of Disaster Relief'. *European Journal of International Law*. Vol. 28(4): 2017. p. 1097-1132.
- Stevenson, Robert Louis. *Treasure Island*. 1883. chapter 12.
- Svec, Martin. 'Outer Space, an Area Recognised as Res Communis Omnium: Limits of National Space Mining Law'. *Space Policy*. Vol. 60: 2022.
- Tanaka, Yoshifumi. *The International Law of the Sea*. Cambridge: Cambridge University Press. 2019. 3 ed. p. 189.
- The White House. *United States Space Priorities Framework*. 2021-12.
- Thirlway, Hugh. 'REFLECTIONS ON *LEX FERENDA*'. *Netherlands Yearbook of International Law*. Vol. XXXII: 2001. p. 3-26.
- Turing, Alan. 'Computing machinery and intelligence'. *Mind*. Vol. 59(236): 1950-10. p. 433-460.
- Wambua, Musili. 'A critical review of the global legal framework on piracy: 40 years after UNCLOS'. *Journal of the National Maritime Foundation of India*.. 2022. p. 134-148.
- W. Brenner, Susan & Koops, Bert-Jaap. 'Approaches to Cybercrime Jurisdiction'. *Journal of High Technology Law*. Vol. 4(1): 2004. p. 1-48.

Digital Sources

- American Society of International Law. 'Beyond National Jurisdiction: Polar Regions'. *American Society of International Law*.
<https://www.asil.org/topics/signaturetopics/BNJ/polar> (Gathered 2022-09-09).
- Andrews, Evan. 'Who Invented the Internet?'. *History*. 2019-10-28.
<https://www.history.com/news/who-invented-the-internet> (Gathered 2022-09-12).
- Archon. 'Cyber Concerns for the Satellite Sector'. *Archon*.
<https://www.archonsecure.com/blog/satellite-cybersecurity> (Gathered 2022-10-07).
- Arthur, Charles. 'Undersea internet cables off Egypt disrupted as navy arrests three'. *The Guardian*. 2013-03-28.
<https://www.theguardian.com/technology/2013/mar/28/egypt-undersea-cable-arrests> (Gathered 2022-09-10).
- Beckman, Robert. 'On the United States, the UN Convention on the Law of the Sea and US Freedom of Navigation Operations'. *Fulcrum*. 2022-08-05.
<https://fulcrum.sg/on-the-united-states-the-un-convention-on-the-law-of-the-sea-and-us-freedom-of-navigation-operations/> (Gathered 2022-10-10).
- Benshoff, Laura. 'The Nord Stream pipelines have stopped leaking. But the methane emitted broke records'. *NPR*. 2022-10-04.
<https://www.npr.org/2022/10/04/1126562195/the-nord-stream-pipelines-have-stopped-leaking-but-the-methane-emitted-broke-rec> (Gathered 2022-10-12).
- Brodsky, Paul. 'The Speed of Light Never Changes—Except When it Does'. *TeleGeography*

- Blog. 2017-07-10.
<https://blog.telegeography.com/the-speed-of-light-never-changes-except-when-it-does>
 (Gathered 2022-10-03).
- Burgess, Brian, 'Forget the Somali Coast – Florida might be the sea piracy capital of the world'. *The Capitolist*. 2017-12-04.
<https://thecapitolist.com/forget-the-somali-coast-florida-might-be-the-sea-piracy-capital-of-the-world/> (Gathered 2022-09-20).
- Cabling installation & maintenance. 'A high-definition touchdown for Michigan State stadium project: short runs'. *Cabling installations & maintenance*. 2007.
<https://www.cablinginstall.com/home/article/16467655/a-highdefinition-touchdown-for-michigan-state-stadium-project> (Gathered 2022-09-06)
- Castagna, Rich. 'Information technology (IT)'. *TechTarget*.
<https://www.techtarget.com/searchdatacenter/definition/IT> (Gathered 2022-10-12).
- Cedre. 'Limburg'. *Cedre*. 2004-05-02.
<http://wwz.cedre.fr/en/Resources/Spills/Spills/Limburg> (Gathered 2022-09-28).
- Cheng, Bin. 'Air Law'. *Britannica*. <https://www.britannica.com/topic/air-law> (Gathered 2022-09-11).
- DataReportal. 'Digital Around the World'. *DataReportal*.
<https://datareportal.com/global-digital-overview> (Gathered 2022-09-12).
- Department of Emergency and Military Affairs. 'Various Definitions of Terrorism'.
Department of Emergency and Military Affairs.
<https://dema.az.gov/sites/default/files/Publications/AR-Terrorism%20Definitions-BO RUNDA.pdf> (Gathered 2022-09-21).
- Designs Buildings. 'Digital infrastructure'. *Designs Buildings*. 2022-08-18.
https://www.designingbuildings.co.uk/wiki/Digital_infrastructure (Gathered 2022-10-12).
- DeweSoft. 'Every Satellite Orbiting Earth and Who Owns Them'. *DeweSoft*. 2022-01-18.
<https://dewesoft.com/daq/every-satellite-orbiting-earth-and-who-owns-them>
 (Gathered 2022-09-16).
- European Center for Constitutional Human Rights. 'Term: Universal jurisdiction'. *European Center for Constitutional Human Rights*.
<https://www.ecchr.eu/en/glossary/universal-jurisdiction/> (Gathered 2022-09-15).
- EROS History Project. '2006 National Space Policy'. *USGS*. 2019-10-09.
<https://www.usgs.gov/media/files/2006-national-space-policy> (Gathered 2022-11-01).
- FBI. 'USS Cole Bombing'. *FBI*. <https://www.fbi.gov/history/famous-cases/uss-cole-bombing>
 (Gathered 2022-09-28).
- Foust, Jeff. 'U.S. Dismisses Space Weapons Treaty Proposal As "Fundamentally Flawed"'. *SpaceNews*. 2014-09-11.
<https://spacenews.com/41842us-dismisses-space-weapons-treaty-proposal-as-fundamentally-flawed/> (Gathered 2022-11-02).
- Hollis, Duncan. 'A Brief Primer on International Law and Cyberspace'. *Carnegie endowment for international peace*. 2021-06-14.
<https://carnegieendowment.org/2021/06/14/brief-primer-on-international-law-and-cyberspace-pub-84763> (Gathered 2022-10-07).
- Holmes, Oliver. 'Space: how far have we gone – and where are we going?'. *The Guardian*. 2018-11-19.
<https://www.theguardian.com/science/2018/nov/19/space-how-far-have-we-gone-and-where-are-we-going> (Gathered 2022-09-17).
- ICPC. 'About the ICPC'. *ICPC*. Updated 2022-09-13. <https://www.iscpc.org/about-the-icpc/>
 (Gathered 2022-09-21).

- ICRC. 'The Law of Armed Conflict'. *ICRC*. 2002-06.
https://www.icrc.org/en/doc/assets/files/other/law3_final.pdf (Gathered 2022-10-14).
- IMO. 'Piracy: orchestrating the response: Launch of World Maritime Day theme for 2011'.
IMO. 2011-02-03.
<https://web.archive.org/web/20131105115422/http://www.imo.org/mediacentre/secretarygeneral/speechesbythesecretarygeneral/pages/piracyactionplanlaunch.aspx>
 (Gathered 2022-09-20).
- Investopedia. 'Infrastructure: Definition, Meaning, and Examples'. *Investopedia*. 2022-07-14.
<https://www.investopedia.com/terms/i/infrastructure.asp> (Gathered 2022-10-12).
- Keizer, Gregg. 'Fishermen pull the plug on Vietnam's Web, steal cable for scrap'.
Computerworld. 2007-06-07.
<https://www.computerworld.com/article/2541664/fishermen-pull-the-plug-on-vietnam-s-web--steal-cable-for-scrap.html> (Gathered 2022-09-06).
- Landguiden. 'Panama'. *Landguiden*.
<https://www.ui.se/landguiden/lander-och-omraden/nordamerika/panama/> (Gathered 2022-09-14).
- McDowell, Jonathan C. (2018), 'The edge of space: Revisiting the Karman Line'.
 Cambridge: *Harvard-Smithsonian Center for Astrophysics*. 2018.
<https://reader.elsevier.com/reader/sd/pii/S0094576518308221?token=F0821B6B6868EB5E8EBF710728B3C746017AE6C117FC917DCF32FF740EB6807B18761EB3F1A89A630DEBB170FE6D3F39&originRegion=eu-west-1&originCreation=20220911144733> (Gathered 2022-09-11).
- Merriam Webster. 'Definition of *depradate*'. *Merriam-Webster*.
<https://www.merriam-webster.com/dictionary/depredation> (Gathered 2022-09-29).
- Merriam Webster. 'Definition of *detention*'. *Merriam-Webster*.
<https://www.merriam-webster.com/dictionary/detention> (Gathered 2022-09-29).
- Merriam-Webster. 'Definition of *infrastructure*'. *Merriam-Webster*.
<https://www.merriam-webster.com/dictionary/infrastructure> (Gathered 2022-10-12).
- Merriam Webster. 'Definition of *plunder*'. *Merriam-Webster*.
<https://www.merriam-webster.com/dictionary/depredation#other-words> (Gathered 2022-09-29).
- Merriam Webster. 'Definition of *violence*'.
<https://www.merriam-webster.com/dictionary/violence> (Gathered 2022-09-29).
- National Environmental Satellite Data and Information Service. 'Where is space?'.
 2016-02-22. *National Environmental Satellite Data and Information Service*.
<https://www.nesdis.noaa.gov/news/where-space> (Gathered 2022-09-11).
- National Weather Service. 'Layers of the Atmosphere'. *National Weather Service*.
<https://www.weather.gov/jetstream/layers> (Gathered 2022-09-11).
- Nord Stream. 'The Pipeline'. *Nord Stream*.
<https://www.nord-stream.com/the-project/pipeline/> (Gathered 2022-10-12).
- O'Callaghan, Jonathan. 'What is space junk and why is it a problem?'. *Natural History Museum*.
<https://www.nhm.ac.uk/discover/what-is-space-junk-and-why-is-it-a-problem.html>
 (Gathered 2022-09-19).
- Overheid. 'International Convention on the Protection of Submarine Cables, with additional Article: Treaty Data'. *Overheid*.
<https://verdragenbank.overheid.nl/en/Verdrag/Details/001885> (Gathered 2022-09-13).
- Oxford Learner's Dictionary. 'Intentional'. *Oxford Learner's Dictionary*.
<https://www.oxfordlearnersdictionaries.com/definition/english/intentional> (Gathered 2022-09-20).

- Oxford Learner's Dictionary. 'Use'. *Oxford Learner's Dictionary*.
https://www.oxfordlearnersdictionaries.com/definition/english/use_1?q=use
 (Gathered 2022-09-27).
- Pallardy, Richard. 'Achille Lauro hijacking'. *Britannica*.
<https://www.britannica.com/event/Achille-Lauro-hijacking> (Gathered 2022-09-16).
- Panama Maritime Authority. 'Leading bulk carriers sector'. *República de Panamá*.
<https://mire.gob.pa/ministerio/the-panama-ship-registry-is-the-largest-in-the-world-since-1993-22-of-the-world-market-share/> (Gathered 2022-09-14).
- Persson, Ida. 'Uppgifter: Nord Stream-läckor kan ha varit medveten attack'. *SVT Nyheter*.
 2022-09-27.
<https://www.svt.se/nyheter/inrikes/nord-stream-lackan-kan-ha-varit-medveten-attack>
 (Gathered 2022-09-29).
- Reagan, Ronald. 'Statement on United States Actions Concerning the Conference on the Law of the Sea'. *National Archives*. 1982-07-09.
<https://www.reaganlibrary.gov/archives/speech/statement-united-states-actions-concerning-conference-law-sea> (Gathered 2022-10-10).
- Safety4Sea Editorial Team. 'Superferry14: The world's deadliest terrorist attack at sea', *Safety4Sea*. 2019-02-27.
<https://safety4sea.com/cm-superferry14-the-worlds-deadliest-terrorist-attack-at-sea/>
 (Gathered 2022-09-28).
- Space Center Houston. 'Mission Monday: Five fast facts about Telstar, the world's first active communications satellite'. *Space Center Houston*. 2020-07-06.
<https://spacecenter.org/mission-monday-five-fast-facts-about-telstar-the-worlds-first-active-communications-satellite/> (Gathered 2022-09-14).
- Spacey, John. '13 Examples of Digital Infrastructure'. *Simplicable*. 2017-10-17.
<https://simplicable.com/new/digital-infrastructure> (Gathered 2022-09-12).
- Steaming Into The Future. 'From Telegraph to Text: How Undersea Cables Connect Us All'. *Steaming Into The Future*. <https://shiphistory.org/2022/01/20/from-telegraph-to-text/>
 (Gathered 2022-09-18).
- Sveriges Radio. 'Magdalena Andersson: Nord Stream leaks most likely sabotage'. *Sveriges Radio*. 2022-09-28.
<https://sverigesradio.se/artikel/magdalena-andersson-nord-stream-leaks-most-likely-sabotage> (Gathered 2022-10-12).
- Swartz, Jon. 'Q&A with Stephen Hawking'. *USA Today*. 2014-12-02.
<https://eu.usatoday.com/story/tech/2014/12/02/stephen-hawking-intel-technology/18027597/> (Gathered 2022-10-03).
- Swinhoe, Dan. 'Tonga's international subsea cable repaired after volcanic eruption'. *DatacenterDynamics*. 2022-02-22.
<https://www.datacenterdynamics.com/en/news/tongas-international-subsea-cable-repaired-after-volcanic-eruption/> (Gathered 2022-09-06).
- TeleGeography. 'Submarine Cable Map'. *TeleGeography*.
<https://www.submarinecablemap.com/submarine-cable/dunant> (Gathered 2022-10-12).
- The Editors of Encyclopedia Britannica. 'Privateer'. *Britannica*.
<https://www.britannica.com/technology/privateer> (Gathered 2022-09-29).
- United Nations. '2. Convention on the High Seas: Geneva, 29 April 1958'. *United Nations*.
https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXI-2&chapter=21 (Gathered 2022-09-13)
- United Nations. '6. United Nations Convention on the Law of the Sea: Montego Bay, 10

- December 1982'.
https://treaties.un.org/pages/ViewDetailsIII.aspx?src=TREATY&mtdsg_no=XXI-6&chapter=21&Temp=mtdsg3&clang=en (Gathered 2022-09-13).
- United Nations. 'International Law and Justice'. *United Nations*.
<https://www.un.org/en/global-issues/international-law-and-justice> (Gathered 2022-11-01).
- U.S. Department of State Archive. 'The Global War on Terrorism: The First 100 Days'. *U.S. Department of State*. <https://2001-2009.state.gov/s/ct/rls/wh/6947.htm> (Gathered 2022-09-28).
- Wattlers, Jackie. 'Elon Musk launched his own Tesla roadster to space four years ago. Where is it now?'. *CNN*. 2022-02-08.
<https://edition.cnn.com/2022/02/08/tech/spacex-tesla-roadster-falcon-heavy-anniversary-scn/index.html>, gathered 2022-09-16).
- Weinzierl, Matthew; Choudhury, Prithwiraj (Raj); Khanna, Tarun; MacCormack, Alan & Rosseau, Brendan. 'Your Company Needs a Space Strategy. Now.'. *Harvard Business Review*. 2022-11. <https://hbr.org/2022/11/your-company-needs-a-space-strategy-now> (Gathered 2022-11-18).
- Weinzierl, Matthew & Sarang, Mehak. 'The Commercial Space Age Is Here'. *Harvard Business Review*. 2021-02-12.
<https://hbr.org/2021/02/the-commercial-space-age-is-here> (Gathered 2022-11-18).
- World Atlas. 'Where Do Artificial Satellites Orbit The Earth: In The Atmosphere Or Outer Space?'. *World Atlas*.
<https://www.worldatlas.com/articles/where-do-artificial-satelites-orbit-the-earth-in-the-atmosphere-or-outer-space.html> (Gathered 2022-09-08).
- Xinhua. 'Danish PM: Nord Stream pipeline leaks "deliberate actions"'. *Global Times*. 2022-09-29. <https://www.globaltimes.cn/page/202209/1276405.shtml> (Gathered 2022-10-12).