TURUN YLIOPISTO
Oikeustieteellinen tiedekunta

From Failure of Pacification to the Accelerating Arms Race to Space 2.0: The Future Space Order

Advanced International Law and Technology

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Author:
Niko-Petri Hakala

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Abstract page

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Abstract in English:

The topic of this thesis is the failure of international regulation regarding the militarization and weaponization of outer space and celestial bodies, the reasons behind it, and the consequences that have their own impact on the diverse forms of competition between states to conquer space and thus determine global power balance both in space and on Earth. The purpose of the research is to improve the general awareness of people about this constantly accelerating phenomenon, but also specifically to improve the understanding of politicians and legal scholars regarding the issues discussed in the study. The weaponization and militarization of space and celestial bodies have significant implications, including the formation of space debris and the grey zone activities. The theoretical basis for the research is legal realism, especially the analytical post-positivist legal research, which is carried out through the lens of critical legal theory. The research methods used include Jorge Esquirol's methods of "gaps, conflicts, and ambiguities," as well as his "blind spots" and "unintended consequences" research methods. In addition, the methods include legal-dogmatic de lege lata and de lege ferenda type research, as well as law and history research methods that involve research, comparison, and analysis related to outdated and incomplete international space legislation. The results of this research show that international space legislation is (intentionally) incomplete and outdated and that the formation of the geopolitical power structure in space is influenced by many factors beyond just political and military interests, such as commercial, academic, and legal interests. However, because of the current international tensions, the competition for control of space is likely to intensify due to military, political, and commercial interests, and hope for peaceful use of outer space and celestial bodies and the ideals of the original space treaties will most probably have to give way.

Key words: space law, international law, geopolitics, militarization, weaponization, self-defence, appropriation, sovereignty, grey zone activities

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Abbreviations

API	Protocol Additional to the Geneva Conventions of 12 August 1949 and relating to the Protection of Victims of International Armed Conflicts (API I), 8 June 1977
APII	Protocol Additional to the Geneva Conventions of 12 August 1949 and relating to the Protection of Victims of Non-International Armed Conflicts (API II), 8 June 1977
ASAT	Anti-Satellite
CBRN	chemical, biological, radioactive and nuclear (weapons)
CHH	Common Heritage of Humankind
CTBT	Comprehensive Nuclear-Test-Ban Treaty
DE	Directed Energy
ENMOD	The Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques
EU	The European Union

FOBS	Fractional Orbital Bombardment System
GPS	Global Positioning System
ICBM	Intercontinental Ballistic Missile
ICJ	International Court of Justice
IHL	International Humanitarian Law
ISRO	The Indian Space Research Organization
ISS	The International Space Station
ITU	International Telecommunication Union
KE	Kinetic Energy
MCF	Military-Civil Fusion
NATO	The North Atlantic Treaty Organization
NB65	Network Battalion 65
NBC	Nuclear, Biological, Chemical
NGO	Non-Governmental Organization
NPT	The Treaty on the Non-Proliferation of Nuclear Weapons
OEWG	Open-Ended Working Group
OST	2222 XI Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies
PAROS	The Proposed Prevention of an Arms Race in Space
PLASSF	People's Liberation Army Strategic Support Force
PMC	Private Military Company
PPWT	Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects
PTBT	The Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water (Partial Test Ban -Treaty)
SDI	Strategic Defence Initiative
SPACE	Spurring Private Aerospace Competitiveness and Entrepreneurship Act
TCBM	Transparency and Confidence-Building Measures in Outer Space Activities
UK	The United Kingdom
UN	The United Nations

UNCLOS	The United Nations Convention on the Law of the Sea
UN COPUOS	The United Nations Committee on the Peaceful Uses of Outer Space
UNIDIR	United Nations Institute for Disarmament Research
UNOOSA	The United Nations Office for Outer Space Affairs
UNSC	The United Nations Security Council
US	The United States
USSF	United States Space Force
USSR	The Union of Socialist Soviet Republics
WMD	Weapon of mass destruction

1 Introduction

1.1 General Background and a Glimpse into the Current State of the Outer Space Weaponization and Militarization

”Avaruus, tuo käymättömistä korpimaista vihoviimeinen.”

”Space, the final frontier.”

-Antero Helasvuo[1]

During the Cold War (around 1947-1991), there was a constant threat of the Cold War turning into a “Hot War”. A probable part of this so-called Hot War could have been the use of nuclear weapons, a weapons system that could endanger the very existence of all humankind on the face of the Earth with just a push of a button. The fear of such a catastrophe and the aftermath of the Second World War brought forward the need for regulating nuclear weapons, other weapons of mass destruction (WMDs), and their usage: if we were to see a nuclear war, its effects would not be limited only to the nations that are at war with each other, but those effects could have disastrous consequences also on a global scale. As a result, we saw the birth of the Nuclear Non-Proliferation Treaty (NPT) that entered into force on the 5th of March in 1970. The agreement can be seen as a necessary step forward in the sense of both the regulation of these matters and international relations. This treaty has, however, received much justifiable criticism after its creation, mainly related to whether it has had any real and lasting effects in regard to controlling nuclear WMDs or not.

The global community addressed the issue of nuclear weapons and WMDs also in space setting in the form of 2222 XI Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (the Outer Space Treaty/OST) in October 1967[2] (note the close proximity to the Nuclear Non-Proliferation Treaty). The basis for the OST was the Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, which was

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[1] Antero Helasvuo, the Finnish translator of the movie *Star Trek V: The Final Frontier.*

[2] 2222 XI Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, 1967 (OST).

unanimously accredited by the UN General Assembly in 1963.[3] Though creating a framework for the space operations of states, unfortunately, OST and other treaties, agreements and conventions related to the outer space/celestial bodies weaponization and militarization have their flaws and loopholes. It is important to find and analyze these defects and have a discussion on them with the closely intertwined themes of appropriation by states (and private actors), states' right to sovereignty and the states' right to (collective) self-defense. Specifically, regarding the weaponization of space, in chapter three I will process and divide the weapons systems into different categories (inter alia space-to-Earth weapons, space to space weapons, Earth-to-space weapons and whether these are kinetic or non-kinetic), while discussing the legislation and its loopholes concerning the weaponization of outer space and celestial bodies.

As Garcia and Pope point out, the launch of Sputnik by the Soviets and the Explorer by the United States in 1957 marked the beginning of a new era for humankind in space related activities.[4] This era is widely considered as the "first space age", ending at the end of the Cold War in 1991.[5] But currently, with the on-going full-blown war in Ukraine escalating the rearmament of different states across the globe, we are entering a second age of space weapons/militarization and a possible usage of WMDs. As anyone who has some sort of military knowledge or experience knows, commanding the high ground is always an advantage over the enemy and as the United States Space Force (USSF) has declared, "the space is the new high ground in modern warfare"[6], a fact also recognized in the scientific literature by scholars such as Lyall and Larsen.[7] This way of thinking in the space setting can

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[3] XVIII Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, 1962.

[4] Garcia 2021, p. 432; Pope 2021, p. 264.

[5] Harrison, T. – Johnson, K. – Roberts, T. G. 2018, p. 12.

[6] Ailor et al. 2021, p. 13.; Also, US Air Force Introduction to counterspace operations 2018: "For decades, the United States experienced unimpeded freedom of action in the space domain. This freedom allowed the delivery of space capabilities essential to the global operations of the US Armed Forces with unmatched speed, agility and lethality. However, peer or near-peer competitors understand the competitive advantage the US derives from space capabilities and view this reliance as a vulnerability. To exploit this perceived vulnerability, adversaries are developing capabilities to negate (deceive, deny, disrupt, degrade and destroy) our space systems and capabilities"; Justesen 2021, p. 111; Additionally, General Jay Raymond has acknowledged that space is a "warfighting domain", Homepage of the US Space Force https://www.spaceforce.mil/News/Article/2954769/brown-raymond-highlight-strengths-intertwined-nature-of-their-separate-services/.

[7] Lyall – Larsen 2009, p. 499.

also be seen as having its roots in the United States former President Ronald Reagan's and his advisor Lieutenant-General Daniel O. Graham's vision of space as the humanity's ultimate "High Frontier"[8] (this term is still used as a name for a currently active non-governmental organization), which ultimately led to the formulation of the "Strategic Defence Initiative" (SDI), often referred to as "Star Wars", with which Reagan intended to render nuclear weapons "impotent and obsolete"[9] (although at least currently, there's nothing "Star Warsy" in the real life weaponization and militarization of space – this will be further elaborated in the chapter three of the thesis). As the SDI considered it to be and as is the case at the moment with the weapons of mass destruction, the threat is not restricted to the surface-to-surface, ground-to-ground, air-to-surface or air-to-ground weaponry/missiles anymore, but the space is additionally a possible battlefield, a zone from where you can effectively act with different weapons systems in a space-to-space, space-to-Earth and Earth-to-space manner. The weapons systems to cause massive damage are not limited to the use of nuclear weapons or other traditional WMDs either: the space weapon technology is, at least partly, based on the ability to cause (massive) destruction in different ways either directly or indirectly. Hence, we can see a direct correlation to the already known weapons of mass destruction and the new emerging need for the regulation of space weapons/militarization of space.

The contemporary, traditional way of understanding weapons of mass destruction (WMDs) is connected to the usage of chemical/biological/radioactive/nuclear (CBRN) weapons, which dates back to the First World War and the enormous usage of mainly biological and chemical weapons during that conflict. But while the chemical/biological weapons are still around (and used in different conflicts, the 2018 Douma chemical attack in Syria as one of the most recent ones) the term weapon(s) of mass destruction is generally connected to the use of nuclear/radioactive weapons. The association of nuclear weapons as the dominant WMD is naturally the result of the sheer, one of a kind, destructional force that they wield and also obviously the role which they have played in different conflicts since the World War II, the Iraq war (2003 to 2011) being the most recent one with an adherence to a nuclear weapons program[10] (it has to be noted that there were also confirmed cases of usage of other weapons

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[8] Homepage of High Frontier http://highfrontier.org/.

[9] Homepage of High Frontier http://highfrontier.org/.

[10] Additionally, another thing worth remembering is the fact that currently there are around six missing nuclear warheads as a result of "Broken Arrows", incidents where a nuclear weapon is accidentally launched, detonated,

of mass destruction such as chemical weapons against the Kurds). As was briefly indicated, the placement of nuclear weapons (or other weapons of mass destruction) in outer space or on celestial bodies has been prohibited by the Outer Space Treaty's Article IV, but it does not prohibit directly, for example, weapons systems that can have an effect on enemy's nuclear command, control and communications satellites, which can be seen to undermine the effect of the theory of retaliative strike and deterrence effect.[11] Here it is also important to notice the Advisory Opinion(s) of the International Court of Justice (ICJ) on the matter, where the court explicably states that for example in the case of the very survival of a state, there is no way of determining if the threat of use or the use of nuclear weapons is to be considered as lawful or not (although generally ICJ states that nuclear weapons are against the international humanitarian law and encourages the disarmament of nuclear weapons).[12] Therefore, whether prohibited or not, a state may act in a way that it sees fitting to its own agenda regardless of the consequences, which could lead to space-related WMD conflicts. I will delve on both of these topics later on in the latter chapters of my thesis.

Together with the weaponization of space, I will also take a look into the theme of the militarization of space. Following the example set by the United States establishing space forces[13] as an independent military branch has been a growing trend among the nations that form the middleweights and heavyweights of the geopolitical arena. The recent events include actions such as the United States of America (the US) establishing its own Space Force, Russia performing a successful anti-satellite weapon test (a test that the US, China and India have executed earlier) and many other countries investing heavily in their defensive and other capabilities in space. Although the topics of militarization/weaponization of space naturally intertwine, it is important to keep these terms apart, since both of them are independent subjects in the sense of legislation and what has already happened so far or is happening in the geopolitical "real life playground". Furthermore, it is very important to bear in mind that the weaponization of space is *not* strictly forbidden in the international treaties *per se* contrary to the militarization of space; a significant loophole that bears an important part in this thesis. I

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fired, lost or even stolen (32 incidents in total), Homepage of the Atomic Archive https://www.atomicarchive.com/almanac/broken-arrows/index.html.

[11] Ailor et al. 2021, p. 298.

[12] Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, 1. C.J. Reports 1996, p. 226.

[13] Homepage of the US Department of Defence https://www.defense.gov/News/News-Stories/Article/Article/2046035/trump-signs-law-establishing-us-space-force/.

will also touch the theme of private/state owned space companies, the so-called private actors, and the subject of intertwining civilian and military interests, such as China's Military-Civil Fusion (MCF), Anonymous, Elon Musk's SpaceX and Russia's Wagner Group as (PMCs as a more of a theoretical) examples of the so called "grey zone activities", hybrid influencing and private actions that could have and already have had an effect in the space related operations. As most recent examples of such activities in the space sphere could be mentioned Elon Musk's immediate response to help and provide Starlink-satellites to help Ukraine in its war against Russia and the (unverified) actions of Anonymous against Russia's space command, where allegedly the communications of Roscosmos, Russia's Space Agency, with their military satellites were disrupted.[14] Additionally, on a universal level, the private actors are growing their presence in space simultaneously with the states, which leads to wider competition and contest in outer space and on celestial bodies.[15] We are also generally increasingly reliant on space and space technologies such as satellites, which concerns civilians and military personnel alike.[16] Therefore we should not forget the commercial nature and significance of outer space exploration, which according to Justesen is driven by the need to secure the new market opportunities[17] and which turns space "from 'empty' to personalized and commercialized"[18] area, even though this is not the main subject of this thesis. Justesen further argues that the role of the commercial suborder is "stronger than ever"[19] and hence it has an impactful effect on the politics; a multi-faceted topic that is related to the symbiosis of private actors, state interests[20] (inter alia companies and the heads of these companies), PMCs

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[14] Homepage of the Independent https://www.independent.co.uk/tech/anonymous-hack-russia-space-agency-roscosmos-b2026574.html.

[15] Hebert 2014, p. 2.

[16] Lubojemski 2019, p. 127.

[17] Justesen 2021, p. 131.

[18] Justesen 2021, p. 126.

[19] Justesen 2021, p. 132.

[20] It should be noted here that for example non-state terrorist organizations are also considered to be private actors, but in order to keep the scope of the thesis reasonable, I am not going to discuss on that topic further. If the topic is of interest to the reader, I recommend familiarizing yourself with inter alia Lehto, Marja. "The Fight Against Isil in Syria. Comments on the Recent Discussion of the Right of Self-Defence Against Non-State Actors.", Nordic journal of international law = Acta scandinavica juris gentium 87.1, p. 1–25, 2018.

and grey zone activities.[21] These topics will be discussed further in the chapters four and five of the thesis.[22]

Together with the aforementioned weaponization and militarization of space, there are also concerns about space debris, fear of compromising the international cooperation in space research[23] and also the grave danger of ruining the efforts made towards the planetary protection, meaning for instance the transportation of Earth-based microbes to outer space and celestial bodies. Naturally the risk for this kind of 'contamination' will increase together with the amount of presence of different state militaries (and private companies) in space. Additionally, there is already a rather high amount of space debris in the orbit of the Earth and space military operations, or usage of space weapons, will only create more of it, as is the case with the above-mentioned anti-satellite weapon usage and tests. Furthermore, the operations in space, whether they are military-related or not, will endanger the international scientific research efforts, not just politically, but in the form of the use of force and also the results of that use of force, such as the space debris potentially endangering and damaging the international space station (ISS) or other research assets. Currently, over 70 nations have their own space programs[24]. This increased commercial and governmental traffic, out of which 90% of the launches are commercial, together with space debris cause hazardous situations and havoc, which then counts towards tightening the geopolitical tensions even further. A perfect example of this is brought to light by Dr. Sophy Antrobus, who points out that the widely condemned Russian ASAT test in 2021 left behind a massive amount of debris still circulating and causing hazardous incidents in orbit.[25]

As important as all the aforesaid is, still the most alarming aspect is the harsh rhetoric used during the conflict in Ukraine by the major geopolitical powers, namely by Russia at the

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[21] On the privatization of war, see inter alia Eckert, Amy E. Outsourcing War: The Just War Tradition in the Age of Military Privatization, Ithaca: Cornell University Press, 2016.

[22] Justesen 2021, p. 132.

[23] Justesen 2021, p. 112.

[24] Homepage of the Guardian https://www.theguardian.com/science/2021/jul/16/the-space-race-is-back-on-but-who-will-win.; The World We Got This Podcast by the Faculty of Social Sciences and Public Policy, King's College London 2022, at 6:25-6:45.

[25] The World We Got This Podcast by the Faculty of Social Sciences and Public Policy, King's College London 2022, at 21:03-21:29.

moment. This rhetoric indicates reversing back to the way of communicating that resembles closely the Cold War use of words and ventures even beyond that in terms of creating nuclear threats, terror and escalation of the conflict overall. Therefore, it is of an utmost importance for the politicians, legal experts and laymen alike to understand the immense value of regulating the subject matter and to act proactively in order to avoid or at least minimize the possible global and collateral damages that the space warfare would inflict on Earth and its occupants. The purpose of this thesis is to provide sufficient data and persuasion for the aforementioned audience to take practical, proactive measures and that there will be international dialogue about the current and future legislation on the weaponization and militarization of outer space and celestial bodies. Together with the deterrence effect (although it has its flaws), that will be discussed more later on in the conclusion, the proactive legislation and anticipatory measures will raise the probability of not having a time of fear that is comparable to the Cold War's "balance of terror". An all-out space-warfare is capable of tremendous destruction, which could also have massive impact on the terrestrial level: there would be no winners, just as would be the case in a more traditional all-out nuclear warfare.

1.2 The Research Questions, Theoretical Approach, Methodology and Methods of the Research

Academically, if we talk about the research theme in a grander scheme of things, no matter if one talks about space law to a fellow law student or a layman, one usually encounters wide eyes and a minor bemused chuckle (sometimes poorly withheld), followed by something such as "That's an unusual topic… but fascinating!"[26] Therefore, if we exclude the legal experts of the matter, space law related topics do not seem to interest a multitude of people at the moment. But as has been mentioned before, we surely can see that the importance of space law in general is ramping up in a quite steep manner following the technological advancements and recent events on the geopolitical playground. Also, another important academic point of view is to emphasize the aforementioned increase in space military operations posing a danger to the international cooperation in space research that has successfully been performed for decades. This leads to endangering these efforts of the scientific community and therefore as the representatives of our academic field, it is crucial to

[26] The comedy series "Space Force" on Netflix can also be seen mirroring the general amused view on these matters.

stress the importance of an effective and coherent international legislative progression in regard to matters concerning space.

I will have three research questions in my thesis:

1. Why has the pacification of outer space and celestial bodies failed?
2. What are the justifications for the militarization and weaponization of outer space?
3. How do the surrounding professional framework and geopolitical reality affect the accelerating militarization/weaponization of space and the controlling of it?

I will process and answer these questions in the following way: the basis for my theoretical approach in the thesis will be legal realism. In a more precise manner, I will perform analytical post positivist legal research within the framework of critical legal theory. I will carry out an internal critique of the international legislation which regulates the militarization, weaponization and appropriation of outer space and celestial bodies. The idea is to find inter alia different gaps, conflicts and ambiguities regarding the different space weaponization/militarization related treaties and at the same time to perform research in the area of legal dogmatics, namely *de lege lata* and *de lege ferenda* research, in order to support the findings of my thesis.[27] This will also provide us with a better understanding of the blind spots, dark sides and unintended (or intended – I will clarify this notion later on in the thesis) consequences of this legislation[28]. In the latter parts of the thesis the aim is to widen the academic view from a purely law-oriented way of approaching the topic and thus additionally to examine different ways of approaching the previous, current and the future legislation. Here I will take a glimpse on the data offered in the related academic literature, such as political and empirical data, in order to support the legislative and other findings and suggested changes that will be discussed in the conclusion.

Treaty-wise the focus will be mostly on the Outer Space Treaty from 1967, although there will be references to a wide array of other conventions, agreements and treaties, such as the Convention on International Liability for Damage Caused by Space Objects (1972), the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies

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[27] Esquirol 2021, p. 1108-1112.

[28] Esquirol 2021, p. 1108-1112.

(1979), the Proposed Prevention of an Arms Race in Space (PAROS) and Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects (PPTW) and other more recent treaties, draft treaties, code of conducts and doctrines. There will also be two common themes that are closely connected to and will be processed together with the weaponization/militarization of outer space through the thesis and those themes in question are the pacification and non-appropriation of space and celestial bodies. Both of these are written in the Outer Space Treaty from 1967 as the Articles II and IV. Also, both of these principles have their extensive heritage and history regarding the more traditional fields of law, mostly regarding the so-called "global commons", upon which I will delve in chapters five and six of the thesis.

I will then use the analysis, references and comparisons to explore these treaties and examine whether the non-appropriation and (partial) demilitarization of space is something that will hold or if we are entering a new era of space exploration where the wide utilization of space will be a necessity, which in turn will lead to increasing space armament. In regard to the Outer Space Treaty and other legislation, I shall go through the aforementioned gaps, conflicts and ambiguities to further explain why it is in itself important to research this topic, why there is a need for an updated legislation and other non-legislative measures and why the protection that for example the Articles II and IV of the Outer Space Treaty offer might not be sufficient anymore. Related to the above-mentioned, I will use historical research, comparison and analysis (law and history approach) to support my findings related to the flaws of the outdated and incomplete legislation arising as the result of the internal critique. The historical methods are used to provide a "bird's eye view" and a historical framework to the theme and research questions of the thesis, but also to provide a framework to the international regulation and usage of the weapons of mass destruction and the legal and political complexities involving the states, private actors, international (space) treaties, international organizations and the grey zone activities. Historical references to important events and previous legislation bound to the research theme and findings also serve as a valuable tool to influence and convince the target audience of the utmost significance that these research questions possess.

Regarding the international doctrinal content, the doctrines of the sovereignty of the state[29], states' right to self-defence[30], the doctrine of collective self-defence[31] and the doctrine of anticipatory self-defence[32] form the doctrinal basis of the thesis. Other significant international doctrines that are related to the topic are the doctrines of acquiescence[33], unilateral act[34], intervention[35], the effects doctrine[36], doctrine of state responsibility[37] and the joint criminal enterprise doctrine[38], which is going to be related to the private actors in the space setting such as private space corporations. Continuing with the list, the recognized doctrines of the international humanitarian law such as the doctrines of armed attack and attribution together with the principles of proportionality, humaneness and necessity (especially regarding the usage of WMDs) have to be taken into account.

Lastly, my own subjective interest as a researcher to this particular topic stems from the fact that philosophically, we can see two different fields coming together here: on the other hand (international) law, an entirely man-made social construction and on the other hand space, which is still, even after all the exploration and research, in large parts an unbeknownst "Wild West" for the human race, i.e., not a man-made construction in the least. It is fascinating to be able to see the space exploration and technology progress so rapidly and to observe the gradual conquest of space and the nearby celestial bodies by mankind. At the same time, although understandable from the point of self-defense, it is still deeply worrying to witness the accelerating intensity of the states' race to militarize, weaponize and (I argue) to colonize the space.

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[29] Crawford 2012, p. 448.

[30] Crawford 2012, p. 563-564.

[31] Crawford 2012, p. 756-757.

[32] Crawford 2012, p. 751.

[33] Crawford 2012, p. 212, 419.

[34] Crawford 2012, p. 416.

[35] Crawford 2012, p. 744.

[36] Crawford 2012, p. 462.

[37] Crawford 2012, p. 555-556.

[38] Crawford 2012, p. 678.

2 The Failed Pacification of Outer Space and Celestial Bodies: Background, Definition of Outer Space and the Gaps, Conflicts and Ambiguities Regarding the Militarization of Outer Space and Celestial Bodies

2.1 Background

As will shortly be demonstrated in a more thorough fashion, the international space legislation is filled with (intentional) gaps, conflicts and ambiguities, but it is also severely outdated, especially regarding the weaponization of space, a loophole which the states are trying to exploit the best they can. As Roxanne Pope mentions, there is also an aspect of complexity since "cumulatively applying different laws" adds to the gaps, conflicts and ambiguities of the indistinctness of the current international space legislation, which in turn incentivizes the weaponization of space by the states since there are no efficient accountability mechanisms.[39]

A perfect example of an ambiguity in the legislation is the lack of a clear definition in regard to where the outer space begins and the national airspace ends, which thus results in acts such as the grey zone activities, where the term refers to actions (by any state) that are perceived to be on the fringes of being considered legal or illegal by the international legislation and community.[40] However, the problems with the legislation do not end there and depending on the precise nature of the loophole, states operate in different ways in order to potentially gain the upper hand in case of a space related conflict, as is the case with for example the dual-use satellites. This leads to the utilization of the weapons systems that will be discussed in this chapter and as a natural continuum, I am going to delve into the different gaps, conflicts and ambiguities in the legislation concerning both space militarization and space weapons. It is important to bear in mind that the militarization and weaponization of space are not "interchangeable terms"[41], so therefore these topics need to be explored separately, although intrinsically there is a natural connection between the two. Academically though there is also

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[39] Pope 2021, p. 300-301.

[40] Homepage of the Center for Strategic and International Studies https://www.csis.org/analysis/competing-gray-zone-countering-competition-space-between-war-and-peace.

[41] Pope 2021, p. 264.

a debate on where the legislation draws the line between the weaponization of space and the militarization of space, as Masson-Zwaan and Hofmann mention.[42]

The Charter of the United Nations I UNTS XVI (the Charter) from 1945[43] provides some basis for legislating the use of force in space setting, which will be discussed later on in chapter four of the thesis.[44] Additionally international humanitarian law (IHL), as it applies to all armed conflicts, and general disarmament law set boundaries to space militarization/weaponization and use of force.[45] It is important to notice that Additional Protocols I and II of the Geneva Conventions (API and APII)[46] additionally limit the advancing space warfare capabilities of states,[47] however, the Protocols are not generally acknowledged customary international law.[48] Lastly, the Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (ENMOD[49]) also restricts the use of space weapons and their possible widespread and critical damage to the environment. Although the space powers are cosignatories to the convention, according to the United Nations Institute for Disarmament Research (UNIDIR), the convention does not have any sort of a verification mechanism to secure its effect.[50]

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[42] Masson-Zwaan – Hofmann 2019, p. 68.

[43] The Charter of the United Nations I UNTS XVI (opened for signature 26th of June 1945, entered into force 24th of October 1945).

[44] Pope 2021, p. 268.

[45] Masson-Zwaan – Hofmann 2019, p. 71; OST Article III.

[46] Protocol Additional to the Geneva Conventions of 12 August 1949 and relating to the Protection of Victims of International Armed Conflicts (API I), 8 June 1977; Protocol Additional to the Geneva Conventions of 12 August 1949 and relating to the Protection of Victims of Non-International Armed Conflicts (API II), 8 June 1977.

[47] API Article 35(3); API Article 36.

[48] Shaw 2021, p. 892.

[49] The Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques 1108 UNTS 151 (opened for signature 4th of October 1978, entered into force 5th of October 1978), Article 1(1).

[50] United Nations Institute for Disarmament Research "Prevention of an Arms Race in Outer Space: A guide to the Discussion in the Conference on Disarmament" UNIDIR 91/79 (1st of October 1991) p. 71-72.

According to Hansen, the dysfunctionality of different international space laws is a hindrance and thus produces gaps in the international space legislation.[51] As an example of this, according to him, rules determining the militarization of space can be disregarded if a state or a group of states are acting in self-defence under the United Nations Security Council's (UNSC) mandate.[52] However, Hansen points out that for instance regarding the possible stationing of WMDs into outer space, it is highly unlikely that UNSC would ever mandate that.[53] Next I am examining more closely the definition of outer space, after which I will move on to the subject of the militarization of space.

2.2 What is Defined as Outer Space?

When considering the subject matter, one would think that it is imperative to establish what is actually defined as *outer space* and what is seen as airspace that is considered to be a part of the sovereign area of each state. But as Crawford states in his book, there is indeed a lack of a "precise boundary between outer space and airspace".[54] He states that this is quite problematic, a view on which it is easy to agree on, since if there are activities on the outer edges of a national airspace, it can be rather troublesome to apply sanctions if there are no clear rules to follow. Crawford therefore makes a suggestion that the "lowest technically desirable altitude of orbit" for a spacecraft, 100 miles (around 160 km), could be a "sensible criterion".[55] Other theories about the specific boundary are the so-called atmospheric space theory, the aerodynamic-lift theory, the lowest-altitude-of-satellite-orbit theory, the usque ad infinitum theory[56] and the Kármán-line (at an altitude of 100 km/62 miles), which some argue has the widest support at the moment.[57] Nevertheless, the international community has not been able neither necessarily willing to define the question of what is legally considered as outer space. There has even been opposition towards setting a precise boundary, especially by

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[51] Hansen 2015, p. 47.

[52] Hansen 2015, p. 51.

[53] Hansen 2015, p. 51.

[54] Crawford 2012, p. 348-349.

[55] Crawford 2012, p. 348-349.

[56] Pershing 2018, p. 151; see also Vosburgh, 1970.

[57] Pershing 2018, p.151.

the United States[58], which is a clear indication of a deliberate policy to leave gaps, conflicts and ambiguities into the space legislation in order to serve the interests of states. This sort of an intentionality is perhaps the most important phenomenon that will be often referred to regarding international space legislation throughout this thesis.

As was already mentioned, it is easy to see just how problematic this is, especially as a member of the legal community. The regulation concerning the national airspace and the outer space is in general very different regardless of the field of law, but it is especially different in the military sense. As a basic example, all nations have a right to defend their sovereignty inside their own airspace[59], but some military operations in outer space are prohibited per the OST Article IV, which includes the prohibition of weapons of mass destruction and military maneuvers in outer space or on celestial bodies during peace-time.[60] However, it is important to note that the Article does not prohibit conventional weapons or perhaps more importantly, weapons of mass destruction during wartime. Regarding the definition of outer space, we have a clear gap in the legislation that leads into ambiguity: if a foreign aircraft enters a nation's airspace, it is subjected to the regulations of that state, but if it was to enter the outer space over that very same state, the aircraft would enjoy a freedom that would be most closely comparable to the vessels' Freedom of the High Seas.[61] But again, most alarmingly, there is a definitive gap in relation to conventional weaponry and wartime WMD usage.

Though it is legally important and sensible to clearly define where the space begins, at this point it suffices to pinpoint the aforementioned problems caused by lack of the boundary and to state that there is indeed an urgent need to make that distinction between national airspace and outer space now that the military space race is ramping up again. Naturally, as long as this definition is left vague and unregulated, the major geopolitical actors have more leeway to operate and perform certain military activities on the fringes of their national airspace and

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[58] Homepage of the Spacenews https://spacenews.com/op-ed-where-does-space-begin-the-decades-long-legal-mission-to-find-the-border-between-air-and-space/.

[59] Art. II of the Convention on International Civil Aviation – Doc 7300, 1944.

[60] OST Art. IV.

[61] Crawford 2012, p. 347.

outer space, which in turn indicates that the gaps, conflicts and ambiguities could be seen as being intentional, favoring some parties while being a burden to others.

2.3 Current Space Military Capabilities of Different States and the Gaps, Conflicts and Ambiguities in the Respective Legislation

2.3.1 The Military Capabilities of Different States

China's direct-ascent ASAT test in 2007[62] marked the beginning of the most recent trend of the current and on-going space rearmament. Since then, various states have increased especially their defensive preparedness related to their satellites and other space assets. Although it is a bit of a challenge to obtain any specific information about the space military organization of China, it is safe to say that China has run a specific military space program called People's Liberation Army Strategic Support Force (PLASSF) at least from the year 2015 onwards after some major military reforms were performed.[63] China's Military-Civil Fusion (MCF) is also to be taken into account: its aim is to combine civilian and military resources efficiently in order to attain military goals and objectives, which can be considered as a major contribution to China's so-called grey zone activities.[64]

Space armament and space related operations conducted by the United States and Russia unsurprisingly stem from the end of the Second World War and had their prime during the Cold War. However, there have been more recent (or at least official and public) developments with the establishment of United States Space Force in 2019, which is a "separate and distinct branch of the Armed Services" [65] meaning it is considered as independent and equal to the more traditional branches of the Navy, Army, Marine Corps, Air Force and Coast Guard. Russia has had its own Space Force for a longer duration, being active since1992, depending on the point of view, since Russia has had several branches related to aerospace and space that have merged and dissolved during the 1990 - 2020

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[62] Homepage of the Guardian https://www.theguardian.com/science/2007/jan/23/spaceexploration.china.

[63] Homepage of the China Aerospace Studies Institute https://www.airuniversity.af.edu/PLASSF/.

[64] Gleason – Hays 2020, p. 8.

[65] Homepage of the United States Space Force https://www.spaceforce.mil/About-Us/About-Space-Force/.

period.[66] However, as is the case with the other nations, Russia's Space Forces were reactivated in 2015 after a merger was performed between the Russian Air Force and the Russian Aerospace Defense Forces.

Further east, India's rising economic and military power has not been resting on its laurels in its space activities and the national space agency "The Indian Space Research Organization" (ISRO) has been working tirelessly for the last two decades trying to further Indian interests in the space domain.[67] Increasing Chinese operations in space initiated discussion in India on how to protect its own space assets and at the same time assure China and other major geopolitical powers of the general capability of India to also retaliate in space if they were to come under an attack from another state.[68] Hence India performed an Earth-to-space kinetic ASAT test in 2019 that produced far less space debris than the before-mentioned ASAT test of China, indicating that India had at least somewhat appropriately prepared for the test and its consequences beforehand. Furthermore, Japan's focus on its operational capabilities in space has also been largely motivated by the growing Chinese space activities. The defensive white paper of Japan from 2019 basically states that the recent developments pose a risk for the peaceful use of outer space and that the current space-related legislation is lacking in its capabilities to prevent the weaponization of space, thus forcing Japan to try and protect its space assets.[69] As is the case with South Korea, Japan has also deepened its cooperation in space activities with the United States and established relevant commands in its military force in order to answer possible threats in, to and from space. During 2020 - 2022 Japan has continued investing in its space defence operations, establishing a second space squadron to monitor threats towards Japanese satellites among other things. The Japanese Prime Minister has stated that Japan will actively improve its defensive capabilities in space, but also that it will still continue the work of enhancing "the peaceful use of outer space".[70]

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[66] Homepage of the Ministry of Defence of the Russian Federation, Aerospace Forces, https://eng.mil.ru/en/structure/forces/aerospace.htm.

[67] Harrison 2020, p. 28.

[68] Harrison 2020, p. 28.

[69] Harrison 2020, p. 27.

[70] Homepage of the Japan Times https://www.japantimes.co.jp/news/2022/01/06/national/japan-space-defense/.

South Korea is also among the nations that have been focusing more on their space warfare capabilities lately. In 2018 it included space security in its new white paper regarding the nation's self-defence and established a new space command that will operate under the Ministry of National Defense. In addition, South Korea has set up a Space Intelligence Center in 2015 and, geopolitically more importantly (and unsurprisingly), the nation has been in close cooperation with the United States, agreeing to "sharing of space situational awareness data" and conducting joint military exercises with the US in 2015 which included inter alia the use of jammers towards navigational capabilities and satellites.[71] In Europe, the *Athena-Fidus/Luch*[72] -incident shifted up gears in France's efforts of improving its military capabilities in space and thereby in 2019 it showcased the nation's new Space Defense Strategy.[73] France established a new Space Command under the branch of the Air Force with a strategy to maintain France as a "leading space power" and develop its "space defence capability" among other things.[74] A French Government official has particularly stated that the question is about self-defence methods and not about offensive means, adding that if France's satellites are under threat, France will consider counter-measures which include inter alia "high-power lasers".[75]

As can be seen, various nations currently have a wide and ever-expanding range of space military capabilities in space. The on-going conflict in Ukraine is surely going to exponentiate this recently up-tempoed process even further as more states are preparing themselves to external threats and to the possibility that the conflict in Ukraine will perpetuate and spread to other parts of the world. I argue that the possible incidents and outcomes of this on-going conflict are going to shape the now and the future of space weaponization and militarization. I will return to the matter of the Ukraine conflict later on in the conclusion of the thesis, but before that, a comprehensive look has to be taken at the legislation related to the militarization

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[71] Harrison 2020, p. 29.

[72] Homepage of Seradata https://www.seradata.com/russian-luch-olymp-k-satellite-may-have-electronically-spied-on-athena-fidus-mission-says-france/.

[73] Harrison 2020, p. 26.

[74] Harrison 2020, p .26.

[75] Harrison 2020, p. 26.

of outer space and celestial bodies and the gaps, conflicts and ambiguities that are included in that legal framework.

2.3.2 The Gaps, Conflicts and Ambiguities in Regard to the Militarization of Outer Space and Celestial Bodies

The Articles IV[76] and IX[77] of the OST add protection against the militarization of outer space and celestial bodies and if there are inconsistencies, the Charter from 1945 will have a priority, but only regarding obligations.[78] According to Hansen, the Charter rights do not take priority over other international agreements.[79] However, Chatterjee claims that the Article IV only prohibits direct military use of celestial bodies while allowing the militarization of outer space.[80] Also the ban of military bases is partial, since the Article directly allows the establishment of the bases if the exploration is peaceful on the Moon or other celestial bodies and the military personnel are allowed to be a part of that peaceful exploration. Adding to the ambiguity, Hebert points out that the interpretation of the term "peaceful purposes" causes division amongst nations, mainly in the sense of whether it means only non-aggressive purposes or strictly non-military purposes.[81] He uses the example of the United States and China to further explain this, since the US has gone the "non-aggressive" way in order to maintain its military interests in space while China has taken the non-military approach since it does not have such a large military presence in outer space (at the moment at least).[82] According to Roxanne Pope, this leaves room for ambiguity/interpretation of the "peaceful purposes" for states and thus leaves a need for the obligations to have "internationally accepted definitions".[83]

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[76] OST Article IV.

[77] OST Article IX.

[78] The Charter of the United Nations I UNTS XVI (opened for signature 26th of June 1945, entered into force 24th of October 1945).

[79] Hansen 2015, p. 49.

[80] Chatterjee 2014, p. 30.

[81] Hebert 2014, p. 6.

[82] Hebert 2014, p. 6.

[83] Pope 2021, p. 301.

Generally, the idea of military bases on celestial bodies, usually the Moon, is a thought that comes repetitively up in the related academic/general discussions, sometimes even as an unavoidable fact of the future. It is even claimed that the Moon and the so-called cislunar space are going to be the determining factor in regard to the accessibility to outer space.[84] There are also private actors that openly and actively inform that they are preparing for Moon-related operations, as is the case with the United Kingdom and the Rolls Royce.[85] I argue that these sorts of developments could lead to a so-called "soft occupation/appropriation" of territory, and it would be plainly naïve to assume that there were not also states' military interests at play. While the prohibition of militarization of outer space and celestial bodies is valid to some extent and although the weaponization of space is both in this thesis and in the real world more of a pressing concern at the moment, we must also pay attention to what possibilities the Article IV leaves open for the militarization of space. This topic will be discussed more thoroughly in chapter four of the thesis.

Regarding the mentioned gaps and ambiguities, it is clearly stated in the Article IV that using military personnel for space research is not prohibited. This leaves some room for the states to possibly further their military interests, as does for example the Chinese Military-Civilian Fusion (MCF)[86], which is a perfect illustration of grey zone activities where a state is acting on the fringes of its legislative rights and duties. MCF aims to integrate the resources of civilian and military sectors in order to specifically bolster the military capabilities of China and according to Gleason and Hayes, "space is not immune" when we are considering China carrying out these joint operations.[87] In practice this means that MCF is used in regard to China's dual-use capabilities for military objectives through the usage of grey/proxy forces, which Gleason and Hayes have argued is to be seen being comparable to the actions and operations that China is currently performing in the South China Sea by using armed fishing

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[84] Justesen 2021, p. 111-112.

[85] Homepage of Rolls-Royce https://www.rolls-royce.com/media/our-stories/discover/2023/uk-space-agency-backs-rolls-royce-nuclear-power-for-moon-exploration.aspx.

[86] Gleason – Hays 2020, p. 8.

[87] Gleason – Hays 2020, p. 8.

vessels as a maritime "militia".[88] It is though important to keep in mind that also the Western astronauts often have positions in the military.

In a wider scope, the outer space and celestial bodies legislation also lacks a dispute settlement mechanism as is stated by Lisa Justesen, even though the need for a dispute settlement mechanism has skyrocketed with the increase in commercial- and military-related activities in outer space.[89] This is the remainder of the earlier reality when space operations considered only a small number of actors, who were able to communicate through bilateral means.[90] Related to this is also the Registration Convention, which can be seen to expand the scope and the effects of the Article VIII of the Outer Space Treaty.[91] However, only 87 per cent of all space objects have been registered either through the national or international registration[92], which is the direct result of nations interpreting freely the requirement to report, effectively eliminating any consistent international practice.[93] Furthermore, no legal sanctions are issued if a state fails to register a space object and it is entirely up to the state itself to decide upon the level of information it is going to offer about the "general function" of the space asset.[94] Chatterjee claims that it is also impossible to verify the information offered by the state, rendering manipulation possible[95] and indeed states have a tendency to not report assets that are purely for military purposes.[96] If we combine this with the extent of the dual-use objects in outer space, we have a massive amount of different military capabilities roaming the orbit, especially when considering that for example Russia and the United States have not registered their space weapons, at least according to the United Nations Office for

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[88] Gleason – Hays 2020, p. 8.

[89] Justesen 2021, p. 138.

[90] Justesen 2021, p. 138; Tronchetti 2013, p. 47.

[91] Masson-Zwaan – Hofmann 2019, p. 31.

[92] Homepage of the United Nations Office for Outer Space Affairs (UNOOSA): United Nations Register of Objects Launched into Outer Space, 1962, https://www.unoosa.org/oosa/en/spaceobjectregister/index.html.

[93] Masson-Zwaan – Hofmann 2019, p. 32.

[94] Chatterjee 2014, p. 32.

[95] Chatterjee 2014, p. 32.

[96] Jakhu et al. 2018, p. 411.

Outer Space Affairs (UNOOSA).[97] Additionally, dual-use assets together with the non-existent legal sanctions against failure to report make it possible for a state to only inform about the civilian use of that very asset and still be able to launch that same asset to orbit.

[97] Homepage of the United Nations Office for Outer Space Affairs (UNOOSA): United Nations Register of Objects Launched into Outer Space, 1962, https://www.unoosa.org/oosa/en/spaceobjectregister/index.html.

3 The Current Space Weapons, Their Capabilities and the Gaps, Conflicts and Ambiguities in the Respective Legislation

3.1 The Armament and Capabilities of Different Weapons Systems

Although there is no general consensus in the academic literature, treaties or the international community on what the requirements are for a weapon to be specified as a "space weapon", generally the space weapons are commonly divided into three categories in the related literature[98]: Earth-to-space, space-to-space and space-to-Earth weapons, a segmentation reflected in, inter alia, the top priority of the reasonably new U.S. Space Force ("Projecting military power in, from, and to space in support of our Nation's interests.")[99] and for example in Karl Hebert's definition of space weapons.[100] It is also worth noting the formulation of the words here: if examined strictly, the words can be seen being against the wording or at least the spirit of the Outer Space Treaty as a whole (as was mentioned before, the weaponization of outer space is at least partly prohibited in the Articles of the treaty).[101] In the light of gaps, conflicts and ambiguities, this can be identified as a clear conflict which serves the interests of respective states to strengthen their position in the space setting while simultaneously hindering their adversaries. Further categorization of weaponry includes dividing the weapons into kinetic and non-kinetic weapons and to weapons with a permanent or a reversible effect on the target.[102] Also a division to conventional, nuclear, WMD, cyber and global power projections is used.[103] Importantly, satellites are *not* considered as weapons by the international community, although they are actually used in a military fashion since they are closely connected to gathering intelligence and military operations; therefore though satellites will be mentioned here and there in this paper, I will not focus on this topic extensively.[104]

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[98] Harrison 2020, p. 5.

[99] Gleason – Hays 2020, p. 1.

[100] Hebert 2014, p. 3; Pope 2021, p. 266.

[101] OST Article IV; Crawford 2012 p. 349.

[102] Gleason – Hays 2020, p. 2.

[103] See inter alia Wong & Fergusson, 2010; Harrison, 2015; Pasco, 2015; Sgobbi, 2015; Bowen, 2020; Deudney, 2020; Justesen 2021, p. 113.

[104] Gleason – Hays 2020, p. 2.

"Earth-to-space" weapon technologies class of arms includes weapons and capabilities such as the "ground-based, direct-ascent, kinetic-kill ASATs" (antisatellite weapons) which can be briefly orbital. These weapons can include for example (nuclear) warheads or projectiles and kinetic weapons that will produce space debris and are usually used to cause permanent effect on the target.[105] Non-kinetic weapons can have either a permanent or temporary effect on the target and this class includes arms such as cyber-attacks, lasers or jamming the communications, for example, between the satellite and its host nation. This also forces the target state to try and protect its space-based assets from such attacks. The non-kinetic weapons are more common among the states mainly because of their lower cost and ease of use and thus several states have tested them in the outer space setting, including states such as Russia, the United States, China, Iran and even North Korea. Kinetic weapons have been tested mainly by the four strongest space nations and that includes the United States, Russia, China and India.[106] Earth-to-Earth-via-Space such as ICBMs[107] are not generally considered as being against the Article IV of OST, as will later be explained in this chapter in a more detailed way.

A similar division of categories is used in the space-to-space weapons systems. Kinetic weapons include arms that are co-orbital and which can cause damage on the target by projectiles ("space based missile defence interceptors"), exploding near the target or even directly crashing the target. These weapons will also produce space debris that could remain circulating in orbit or could crash down to the Earth. Non-kinetic weapons are also similar to Earth-to-space weapons, so therefore we are talking about jammers and lasers which are in this case situated in orbit together with their targets. A similar analogy to the damage caused applies in these weapons that applied to the Earth-to-space weapons, i.e. the damage of the kinetic weapons is usually permanent and the damage caused by non-kinetic weapons can be either permanent or temporary.[108] An example of a space-to-space non-kinetic weapon usage is the previously mentioned case of France accusing Russia of using its satellite *Luch/Olymp-*

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[105] Gleason – Hays 2020, p. 2.

[106] Gleason – Hays 2020, p. 2.

[107] Pope 2021, p. 266.

[108] Gleason – Hays 2020, p. 2.

K to intercept military communications by placing it in close proximity of the French-Italian broadband military communications satellite *Athena-Fidus* in 2017.[109]

Space-to-Earth category is perhaps the narrowest (and some could argue the most fictional) one of the different space weapons systems. The Soviet Fractional Bombardment System (FOBS) might have been one that could have been considered as such, but technically the weapons system did not complete a full orbit during its operational years and therefore has not been classified as a space-to-Earth weapons platform. Again, space-to-Earth non-kinetic weapons include mainly lasers and jammers[110], which fall to the category of Directed Energy Weapons (DE) as opposed to the Kinetic Energy Weapons Systems (KE).[111] These weapons offer the possibility to strike anywhere on the globe in a far quicker fashion than is possible with the more traditional land, sea and air assets. Right now, in terms of reach, the closest weapons to these in the traditional armament systems are the intercontinental ballistic missiles, however, it has to be taken into account that the place of the weapons system in orbit also affects the usability and quickness of that space-to-Earth weapons system.

3.2 The Gaps, Conflicts and Ambiguities in Regard to the Weaponization of Outer Space and Celestial Bodies

3.2.1 General Background – Treaties, *ius cogens*

Among the first treaties limiting the weapons in space was the Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water (Partial Test Ban treaty/PTBT) in 1963. The reason for the birth of this treaty was in the fact that during those times both the United States and the Soviet Union were conducting nuclear tests in space. Several tests were performed by both nations (the Cuban missile crisis was an ongoing event at that time) and the notable effects on the space environment forced the nations into the aforementioned agreement. It is important to notice that there have not been any nuclear tests in space after the creation of the treaty, basically meaning zero tests since 1963. The treaty effectively bans the use and tests of nuclear weapons in the spheres of Earth-to-space and space-to-space kinetic weapons. What the treaty does not markedly ban is the use of non-

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[109] Harrison 2020, p. 25.

[110] Gleason – Hays 2020, p. 2.

[111] Pope 2021, p. 266.

nuclear weapons, which is to a certain extent understandable, given the context and emphasis on the nuclear weapon tests at the time of the creation of the treaty, but nonetheless, it leaves a clear gap in the general legislation of the weaponization of outer space and celestial bodies that closely resembles the aforementioned deficiency in regards of the OST.[112] In addition, it does not comprehensively disallow the placement or usage of nuclear weapons in outer space.[113] Deserving also a brief mention is the Comprehensive Nuclear-Test-Ban Treaty (CTBT[114]), which is not yet enforced, but can be seen as having had a normative effect as a result of conducting its verification system successfully.[115] Considering *ius cogens*, non-aggression of the states could hinder the insertion of space weapons (at least in some cases)[116], however naturally non-aggression is not jeopardized if space weapons are deployed and tested during peacetime (notwithstanding situations where there is threat of use)[117], not including the limitations set on the weapons development by the API or similar normative constructions. Generally customary international law binds in the space setting, but it might not be optimal for regulating space related matters since it requires that the states recognize it for it to be binding.[118]

Additionally, the Convention on International Liability for Damage Caused by Space Objects (the so-called Liability Convention) from 1972 and the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (the so-called Moon agreement) from 1979 deserve to be mentioned. These treaties have tried to limit the weaponization and militarization of space in their own way[119], when the Liability Convention has defined some key terms in its Article I regarding the use of space weapons. Rather importantly, "damage" is not outlined there to only include non-kinetic damage but also kinetic damage. In addition, the

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[112] Harrison 2020, p. 9.

[113] United Nations Institute for Disarmament Research "Prevention of an Arms Race in Outer Space: A guide to the Discussion in the Conference on Disarmament" UNIDIR 91/79 (1st of October 1991) p. 70.

[114] Comprehensive Nuclear-Test-Ban Treaty, 35 ILM 1439, opened for signature 24th of September 1996, not yet in force.

[115] Anastassov 2010, p. 67.

[116] Chatterjee 2014, p. 33.

[117] Su 2017, p. 68.

[118] Pope 2021, p. 267.

[119] Harrison 2020, p. 10.

"launching state" is seen to include the state that launches, procures the launch of or "from whose territory or facility the launch is conducted".[120] Furthermore, the Articles II and III offer and distinguish different types of liability for the uses of space-to-Earth and space-to-space weapons.[121] Most importantly, the treaty has been ratified by almost 100 nations and international organizations, including the leading space nations Russia, India, China and the United States.[122] The Moon agreement on its part had the role of reinforcing the prohibition concerning the placing of weaponry on the surface of the Moon (as well as the demilitarization of the Moon).[123] Rather importantly, and contrary to the Liability Convention's number of signatories, the Moon agreement is ratified by only 18 states which does not include any of the current major space nations.[124] Again, although the Outer Space Treaty prohibits the placement of weapons and military on the celestial bodies and it has 109 nations (including the four major space powers) that have ratified it[125], this again gives us a glimpse on how the Moon is viewed in the grander scheme of geopolitics and also on the intentional legislative ambiguity regarding this celestial body.

As was previously stated, the demilitarization/de-weaponization attempts of outer space and celestial bodies has been carried out through the formulation of the Article IV of the Outer Space Treaty.[126] However, as James Crawford states in his book, the demilitarization "regime" might be inadequate to deter the weaponization of space. His view is shared by a

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[120] Resolution 2777 (XXVI) The Convention on International Liability for Damage Caused by Space Objects (the Space Liability Convention), 1972, Article I.

[121] Resolution 2777 (XXVI) The Convention on International Liability for Damage Caused by Space Objects (the Space Liability Convention), 1972, Articles II and III.

[122] Homepage of UNOOSA, Status of International Agreements relating to activities in outer space as at 1st of January 2019, https://www.unoosa.org/documents/pdf/spacelaw/treatystatus/AC105_C2_2019_CRP03E.pdf.

[123] Harrison 2020, p. 11.

[124] Homepage of UNOOSA, Status of International Agreements relating to activities in outer space as at 1st of January 2019, https://www.unoosa.org/documents/pdf/spacelaw/treatystatus/AC105_C2_2019_CRP03E.pdf.

[125] Homepage of UNOOSA, Status of International Agreements relating to activities in outer space as at 1st of January 2019, https://www.unoosa.org/documents/pdf/spacelaw/treatystatus/AC105_C2_2019_CRP03E.pdf.

[126] OST Art. IV.

number of legal scholars, such as Krepon et al.[127] and Roxanne Pope[128], according to whom space weapon testing is not prohibited during peacetime by any treaty, convention or customary law.[129] Opposing views have also been presented, for instance by Garcia who states that the militarization of space does not necessarily mean that space has been weaponized.[130] Next I'm going to explore some of the most notable gaps, conflicts and ambiguities created by space treaties in relation to the weaponization of outer space. Regarding the agreements, it is important to note that there are no treaties that fully cover and restrict the use of aforementioned six different categories of space weaponry.[131] Critics could ask why the legislation is of such an importance; if we take a look at for example chemical/biological weapons, they have existed for around 100 years, but still they are used.[132] The importance of legislation lies in the fact that the legal framework will act as deterrence, provide the required basis for the international condemnation of the usage/attacks and it will also act as a basis for the countermeasures of the international community, mainly by the United Nations and its Security Council. In the light of this, it is also important to remember that in the regulatory efforts the consequences, whether positive or negative, distribute unevenly among the "winners" and "losers" and that additionally to the intentional gaps, conflicts and ambiguities together with the unwillingness of the states (again) have a significant role to play in all of this.

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[127] See Krepon, Michael – Clary, Christopher, Space Assurance or Space Dominance: The Case Against Weaponizing Space, The Henry L Stimson Center, 2003, p. 28-36 for an extensive discussion on the distinction between space weaponization and space militarization. Additionally, see Harrison, Todd, International Perspectives on Space Weapons, CSIS, May 2020 https://www.csis.org/analysis/international-perspectives-space-weapons.

[128] Pope 2021, p. 263.

[129] Pope 2021, p. 301.

[130] Garcia 2021, p. 423; See Steer, Cassandra, Why Outer Space Matters for National and International Security, A report by the Center for Ethics and the Rule of Law (University of Pennsylvania), January 2020; Garcia 2021, p. 423.

[131] Harrison 2020, p. 10.

[132] Homepage of the BBC https://www.bbc.com/news/world-middle-east-23927399.

3.2.2 The Gaps, Conflicts and Ambiguities Regarding the Weaponization of Outer Space and Celestial Bodies in the Current International Space Legislation

The very first problem that we face is the fact that there is no general consensus on *what* is precisely classified as a space weapon, a problem that was also the case with the definition of space, which again adds to the ambiguity of the international space legislation. On the other hand there seems to be a consensus regarding satellites not being considered as weapons, even if they are used for military communications, GPS and other military-related activities.[133] But when we are examining the states' diverse weapons systems with capabilities to operate in, to or from outer space, again, there are no clear agreements defining such a weaponry for various reasons, mainly due to the multiple political, commercial and military interests of the states involved.

The reason for lack of definition is multifaceted, but mainly leans towards the political unwillingness of the space nations, their specific interests and the drive to hinder the capabilities of their adversaries. An example of this is the proposal by China and Russia on space weapons prohibition, the Draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects (PPWT)[134], which would only prohibit weapons that are stationed in space and can have space-to-Earth capabilities.[135] The United States has argued that the proposal is only designed to hinder the US space assets, allowing Russia and China to focus more on developing their Earth-to-space and space-to-space weapon capabilities.[136] While not directly related to the definition of a space weapon, this clearly indicates how the states have their own motivations and agendas behind their disarmament proposals, which is obviously hardly a surprising fact at this point.

Thus, individual states have differing views and definitions of what is considered to be a space weapon, which seems to be an intentional ambiguity that plays differently for various state actors as demonstrated above. Additionally, as the other major geopolitical actors had already done earlier, India also performed a successful Earth-to-space kinetic ASAT test in

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[133] Gleason – Hays 2020, p. 2.

[134] The Draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects (PPWT), 2014.

[135] Harrison 2020, p. VII.

[136] Langeland – Grossman 2021, p. 23-24.

2019.[137] Yet, after the test, the then Prime Minister of India, Narendra Modi, issued a statement declaring that the test will not change the nation's stance against the weaponization of space, a statement that some argue indicates that India does not consider ASAT-capabilities as a space weapon.[138] The nations have failed to come together with their own views/definitions in order to find a compromise[139], being too driven by their own agendas and fears of their geopolitical adversaries to really focus on the definition of a space weapon in order to speed up the disarmament of outer space and celestial bodies.

Related to this, Harrison sees that there are four key distinctions why individual states view space weapons in different ways.[140] He argues that the first distinction is connected to the fact that the prohibition of nuclear weapons has been carried on from the previous treaties to the space treaties, but that there is no similar mechanism/consensus to be found when traditional or conventional space weapons are considered. He also sees that the second distinction is that the placement of these weapons and weapons systems creates schism between the nations, as only some capabilities are suggested to be banned in different treaties or treaty proposals, depending on whether the weapons are placed on the Earth or in space. A good example of this is the aforesaid PPWT, where Russia and China have tried to achieve a partial ban for weapons situated in space. The third distinction he mentions is whether the weapon in question produces orbital debris. The debris can cause significant collateral damage to the individual states' space assets and can also endanger the peaceful scientific research of space. Lastly, the fourth distinction considers whether the space weapons are used for defensive or offensive purposes. Both the PPWT and the European Union's (EU) proposed Code of Conduct leave room for using the weapons for self-defence.[141]

Regarding the OST, the Article IV does prohibit the use of kinetic nuclear weapons in the space-to-space and space-to-Earth related settings together with the banning of the use and

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[137] Harrison 2020, p. 20-21.

[138] Harrison 2020, p. 20-21.

[139] Which can be seen in the fact that no treaty clearly prohibits laser, jammers, electromagnetic pulse weapons that are used as "information weapons" against another state's "information systems"; See Stockholm International Peace Research Institute "SIPRI Yearbook 2019: Armaments, Disarmament and International Security" (Oxford University Press, Oxford, 2019), p. 484.

[140] Harrison 2020, p. VI-VII.

[141] Harrison 2020, p. VI-VII.

testing of all conventional and nuclear forms of weaponry in the space-to-space setting and on celestial bodies[142]. Yet far more important is the fact that it *does not* prohibit the placing of conventional weapons in space, causing space debris from weapon attacks or dual-use assets, which again is a clear deficiency in the legislation.[143] It can also be argued that the OST does not address for example ICBMs containing nuclear warheads entering the Earth's orbit.[144] It seems that in the relevant literature a complete orbit is often required and that the prohibition of the Article IV of OST does not apply to ICBMs that would be considered as WMDs.[145] However, inter alia Jasani offers a contrary view, stating that a partial orbit could suffice, though he continues that this view might not gain popularity since the opposing view has wider traction.[146] Furthermore CTBT and PTBT do not set boundaries for using space assets as delivery systems for weapons of mass destruction, adding to the incompleteness of the international space legislation.[147] Nonetheless, the WMDs are not and should not be the sole focus anymore[148], since the weapons technologies have advanced and debris-wise there are new weapons systems potentially causing havoc, as the previously mentioned ASAT tests have demonstrated.

Regarding strictly WDSs, according to Masson-Zwaan, again there is currently no absolute definition of WMD,[149] which again leaves room for interpretation and ambiguity. More traditional views such as the OST Article IV list of NBC-weapons (nuclear, biological, chemical) apply, but more importantly it does not include for example the current capabilities of debris-causing space weaponry, such as the ASAT-missiles. According to Hebert, the

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[142] OST Article IV.

[143] Harrison 2020, p. 5, p. 10; Gleason – Hays 2020, p. 7; Taft 2017, p. 366.

[144] Taft 2017 p. 366; Lyall – Larsen 2009 p. 519.

[145] Jasani – Lunderius 1980, p. 66; Hansen 2015, p. 40; Lyall – Larsen 2009 p. 519; Taft 2017 p. 366.

[146] Jasani – Lunderius 1980, p. 66.

[147] Hebert 2014, p. 5.

[148] Taft 2017, p. 369.

[149] Masson-Zwaan – Hofmann 2019, p. 19.

definition of the ability of a weapon to produce mass casualties is also problematic since it imposes the need to be able to determine the amount of the casualties.[150]

I argue that the lack of proper legislation can also be seen to incentivize proper, heavy weaponization of outer space (vs. the current capabilities such as jammers, lasers, kinetic ASAT-weapons etc.) and motivate states to strive to be the first ones to do it in order to gain the previously mentioned "high command" and the upper hand in possible conflicts. As has previously been touched upon briefly, soft law attempts have been made to regulate the matter. For example, on an organizational level the EU has accepted the Earth-to-space and space-to-space weapons in its 2014 Code of Conduct.[151] I argue that although this type of a soft law approach can be seen as a way to regulate matters little by little while maintaining and even increasing dialogue between adversaries (mainly the US vs China/Russia), we are still facing the same problems: the proposals and codes of conduct involve aforementioned intentionality of leaving diverse gaps, conflicts and ambiguities in the legislation and thus driving the agendas and interests of the proposers, that is, strengthening their position while worsening the position of their adversaries. Even if the code of conduct includes limitations on justification such as the EU Code of Conduct's requirement for safety, prevention of space-debris or self-defence, these limitations quickly lose their meaning if the *ethos* of the surrounding geopolitical reality is basically in favor of increasing rearmament in the space setting. However, in more peaceful times this type of a dialogue and development through soft law measures could be exactly the step leading to some other forms of legislation or other positive developments, with which the intentionality of the gaps, conflicts and ambiguities could on the other hand be slowly subsided. Still, I find this kind of a train of thought rather optimistic: one only needs to examine the rhetoric and diplomatic actions of states like Russia regarding nuclear weapons and related treaties since the start of the Ukraine war to quickly reach the conclusion that decades of successful hard work can be nullified fairly quickly in times of war.

There are other views though, since for instance Garcia claims that although there is a competition looming on the horizon among the greater powers (and the shifting of global

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[150] Hebert 2014, p. 7.

[151] Harrison 2020, p. 1-23.

power) in regard to natural resources, we can still through the so-called "global commons"[152] (of which space is a part of) study this phenomena.[153] With this concept it is possible to reduce the "uncertainty" between states and thus prevent conflicts with "reiterated meetings", which lead to creation of communities that "interact with states".[154] She makes a specific reference to international treaties as benefiting states and their interests while simultaneously promoting international cooperation.[155] Garcia also suggests that the United Nations Convention on the Law of the Sea (UNCLOS) could be seen as setting an example in regard to regulating space related matters.[156] I argue that the ruling view though in the literature seems to be that the arms race is already in process, but at this point it is still possible to set at least some limits through international legislation which will be imperative *when* (not if) the first space conflict occurs, possibly also impacting the terrestrial level extensively.[157] Yet, there is no denying that the current geopolitical tensions do significantly impede these kinds of discussions.

3.3 Limiting Factors and Later Developments Regarding the Weaponization of Space, Peacetime Testing and Usage of WMDs in Space

The UN General Assembly has adopted several relevant resolutions since the formation of the PAROS treaty in 2005[158], keeping the matter of space weaponization at hand. Related to the PAROS treaty is the draft treaty on banning the placement of weapons in space and the submission of a Code of Conduct for space activities, which again is not legally binding though.[159] All the previously mentioned agreements can be seen to emphasize the fact that the

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[152] Crawford 2012, p. 333-351; Garcia 2012, p. 423.

[153] Garcia 2021, p. 423.

[154] Garcia 2021, p. 425.

[155] Garcia 2021, p .425.

[156] Garcia 2021, p. 423-439.

[157] It is important to notice that according to Justesen, there is a general concern in regard to the possible first space related conflict in the meetings of the UN COPUOS and that the hope is that the conflict will be of "suitable scale" in order to encourage the regulation efforts; Justesen 2021, p. 143-144.

[158] Prevention of an arms race in outer space: further practical measures for the prevention of an arms race in outer space GA Res 74/34 (2019) Art. I; Harrison 2020, p. 12.

[159] Masson-Zwaan – Hofmann 2019, p. 70.

current international space regulation cannot prevent the weaponization of space, which underlines the existence of the previously mentioned gaps, conflicts and ambiguities and the pressing need to replenish and update the legislation in order to control the weaponization/militarization of space.[160] Another example (representing also soft law since it is non-binding) would be the Transparency and Confidence-Building Measures in Outer Space Activities (TCBM) from 2005[161] (TCBM-related discussion continued at least up till 2017 in the UN and the United Nations Committee on the Peaceful Uses of Outer Space [UN COPUOS]) for which Russia and China acted as the "locomotives". Yet again, while on the surface the aim seemed to be to ensure safer usage of outer space, the fact is that both China and Russia almost simultaneously performed ASAT tests (2007 and 2008)[162], and both of these nations were (and perhaps still are) behind the US in their space-related capabilities. Accordingly, especially now in the light of the Ukraine war, it appears that the aim was originally only to hinder the capabilities of adversaries, mainly the US.

As Crawford states in his book, there was also another effort towards de-weaponizing the outer space by Russia and China in 2008 when they presented a draft treaty PPWT on the topic to the UN Conference (the treaty would not, however, prohibit kinetic or non-kinetic Earth-to-space weapons[163]). This proposal was updated in 2014 in order to broaden the term "space weapon" and to include any outer space object and as well as adding the collective self-defence to the protection of the state's right to self-defence.[164] Again we are discussing the intentional gaps, conflicts and ambiguities, as the fact of the US opposing the adoption of the treaty speaks volumes about the issues at hand: as long as there is no strict legislation on the subject, the major geopolitical powers have their freedom of action in operating these matters. This is again among the most pressing gaps and ambiguities in the current outer

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[160] Prevention of an arms race in outer space: further practical measures for the prevention of an arms race in outer space GA Res 74/34 (2019) Art. I.

[161] Transparency and confidence-building measures in outer space activities: revised draft resolution / Russian Federation A/C.1/60/L.30/Rev.1 2005.

[162] Harrison 2020, p. 12.

[163] Harrison 2020, p. IV.

[164] Harrison 2020, p. V.

space and celestial bodies related legislation and of the utmost importance which could have the gravest of consequences if not acted upon.

Another future concern is that at least the great space nations seem to have been avoiding pledging themselves further to the demilitarization of the Moon and other celestial bodies while the advancing technological means are making the opposite more and more feasible and commercial interests seem more and more lucrative, which has already led to the aforementioned grey zone activities. Further down on the path, it could also lead to nations trying to wiggle their way out of the OST and attempting to establish a sort of a "legal vacuum" concerning the celestial bodies. While perhaps this idea may seem distant, improbable and covered by the OST at the moment, the pursuit of acquiring new "free" territory (especially before any other state, and even if the area is declared to be *terra nullius*) has always prevailed in the history of the human race. As long as there are globally tightening tensions in the geopolitical arena like there are currently due to the ongoing war in Ukraine, the major space nations will have their strategic eye on the Moon. It is futile to expect cooperation of any sort in these matters since so few have ratified[165] the Moon agreement, especially during these times of heightened geopolitical tensions.

In regard to satellites, their purpose of use varies (civilian/military, offensive/defensive, active/passive, dual-use etc.) and hence especially the dual-use of satellites accelerates the space armament, since nations have to be prepared to take appropriate countermeasures in both peacetime and in times of war.[166] As was previously stated, there is no general consensus on the exact nature or definition of a space weapon and the system lacks mechanisms with which to enforce even the existing legislation, especially regarding the dual-use satellites.[167] However, even though generally satellites are not considered to be space weapons, according to Hansen they could be seen as legitimate targets[168]. But there remains the ambiguity of the very nature of the purpose of the satellite and when combined with the fact that there might be civilians that rely on the satellite even in third party (third party as in not a part of a possible

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[165] UNOOSA, Status of International Agreements relating to activities in outer space as at 1st of January 2019, https://www.unoosa.org/documents/pdf/spacelaw/treatystatus/AC105_C2_2019_CRP03E.pdf.

[166] Lubojemski 2019, p. 134-135.

[167] Lubojemski 2019, p. 135.

[168] Hansen 2015, p. 54-55.

on-going conflict) countries, an attack against such a dual-use satellite could very well be seen as an attack against civilian infrastructure.[169]

According to Masson-Zwaan and Hoffman, another thing to bear in mind is that IHL also limits the space weapon arsenal usable by states and especially weaponry that could cause debris, since the principles of distinction and proportionality could be violated.[170] Su agrees with this statement adding weapons that have kinetic effect on the target.[171] Therefore IHL, while limiting, also adds to the list of gaps, conflicts and ambiguities related to the international space legislation since it is applied *only* when a conflict is underway,[172] i.e rendering it possible to test/deploy space weaponry during times of peace. Also, weapons capable of required precision can be used in conflicts since they are not "indiscriminate" and thus there is no high risk for collateral damage.[173] Regarding debris-causing effects, IHL, the Charter and ENMOD do not restrict the research, deployment and testing of new space weapons in peacetime even if the weapons possibly produce debris.[174] Considering all of the above, I argue that the extent of the conflict will also matter when considering the principles of distinction and proportionality. Naturally, the possible effects will be judged differently if the conflict at hand is fairly minor, involving a small number of parties than if there is a conflict on a larger scale, for example a world war.

According to Chatterjee, there is also an ambiguity in regards of the Liability Convention's definition of a space object when "fragments" and "microparticulate" matter are considered.[175] He continues that victim states are not protected by a "fault-based" regime, because currently no tracking mechanism exists for solving the identity of a space object, not at least an internationally accepted one.[176] He adds that the definition of damage does not

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[169] Hansen 2015, p. 56.

[170] Masson-Zwaan – Hofmann 2019, p. 72.

[171] Su 2017, p. 84.

[172] Pope 2021, p. 283–284.

[173] Chatterjee 2014, p. 34.

[174] UNIDIR p. 72.

[175] Chatterjee 2014, p. 39.

[176] Chatterjee 2014, p. 40.

cover everything since the damage caused in the space environment by the debris is not accounted for.[177] This vagueness again motivates states to invest in their space weapon capabilities, thus leading to further armament accumulation, which is a historically familiar phenomenon on the terrestrial level.[178] Garcia points out that at the moment peace still prevails in outer space, but in the end she also shares the view of the rising tensions and that the regulatory framework seriously requires an update and strengthening.[179]

As stated above, some actions concerning space weapons are legal during peacetime and illegal during a conflict. This is far from logical and yet again shows (intentional) gaps in the legislation, since for example peacetime ASAT tests have caused significant amounts of debris already[180], but according to the current international legislation the debris-causing effect is reprehensible only in times of conflict.[181] Additionally as was discussed, the major space nations have ratified some of the treaties such as the OST, but more importantly they have not widely ratified other treaties such as the Moon treaty. All this again adds to the fact that the international space legislation in regard to both the militarization and weaponization of space is currently riddled with gaps, conflicts and ambiguities, which contain unintended and intended consequences and blind spots. Ideally, these would be covered and thus inter alia provide legal basis for actions of international organizations such as the UN Security Council in space related conflicts, but all this work remains to be done. This aspect of the topic in hand, among other things, will be discussed and elaborated further in the conclusion.

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[177] Chatterjee 2014, p. 40.

[178] Lubojemski 2019, p. 130-131; Pope 2021, p. 301.

[179] Garcia 2021, p. 423.

[180] Homepage of the Guardian https://www.theguardian.com/science/2007/jan/23/spaceexploration.china.

[181] Debris-causing effect is not specifically mentioned in these treaties, but these treaties contain articles which are connected to the debris-causing effect, such as inter alia ENMOD (if the treaty is interpreted as a whole), The Charter Art. 51, Art. 2(3) and Art. 2(4), IHL (API I).

4 Possible Justifications for the Militarization and Weaponization of Outer Space and Celestial Bodies: Right to Sovereignty, Right to (Collective) Self-Defence and Right and Drive for Appropriation/Acquisition of Territory

4.1 Right to Sovereignty

After analyzing the gaps, conflicts and ambiguities in international space legislation, the "other side of the coin" must be addressed in regard to the militarization and weaponization of space. Here I am inspecting more the reasons behind the actions of space states and their possible justifications. However, already at this point it must be noted that there should also exist a balance in the international space legislation and this balance of different rights and the symbiosis of the different factors will be discussed more closely in chapters five and six. Now, however, a brief look must be taken at the possible (legal) justifications and motives for nations conducting operations in outer space and celestial bodies, especially regarding the Moon. The aim is to provide some *ratio* on the acts of individual states in the geopolitical field, while simultaneously providing examples of critique and discussion on the topic. Here we are facing an ever more complicated and complexifying dimension of warfare: the commercial, legal, scientific, military and political dimensions possess also a defining and directive role as the major superpowers (mainly the US, China and Russia) together with private actors are racing towards obtaining space resources and attempting to secure a determining role/position in the space domain.[182]

The doctrine of sovereignty is one of the most fundamental customary international law doctrines that concerns states.[183] This doctrine closely connects with all the other doctrines presented in this thesis, since the doctrine of self-defence is essentially about the protection of the very sovereignty of a nation. It is also closely related to the doctrine of acquisition of territory (appropriation), which I will cover later in this chapter, in the sense of establishing sovereignty on the specific acquired territory. When considering the

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[182] Justesen 2021, p. 216: US Secretary of State, Michael Pompeo: "[t]his is not a Cold War 2.0 but something worse and more complicated. The reason is that the Chinese communist party is now so deeply involved in our economies, political systems, and societies than the Soviet ever was" in Prague, to advice the leadership of the Czech Republic to choose American hardware (Lundin, 30 August 2020).

[183] Crawford 2012, p. 448; Garcia 2021, p. 423.

weaponization/militarization of space and even grey zone activities, preserving and protecting the sovereignty of the state could be seen as a possible justification. However, this right should be in balance with the other aims of the international community, such as the de-weaponization and demilitarization of outer space and the celestial bodies and this balance will be examined further upon in the concluding chapter of the thesis.[184]

Scholars such as Kurt Anderson Baca argue that the issue of sovereignty should be reconsidered in space since property rights in space are essential in order to develop space resources.[185] Garcia argues that despite the concerns of the militarization of outer space and celestial bodies, there really have been no conflicts in that sphere, which she regards as part of the so-called global commons.[186] According to her, the global commons are "domains that have an inherent value for humankind and the planet, and therefore have assumed a non-national status in international relations".[187] She continues that the state sovereignty over a territory stands aside while global commons (law[188]) retains "the defining 'non-national' characteristic in which jurisdictional claims are barred", which leads to giving a priority to common peaceful purposes and joint exploration instead of legal ownership.[189] Additionally to outer space and celestial bodies, examples of these kind of territories include areas such as the Antarctica and the High Seas,[190] while cyberspace/metaverse and the Amazon are considered as new additions to the academic conversation because of their indisputable importance to the humankind and planet.

Therefore, instead of competition, states should guard and preserve these areas of interest. Garcia continues that opposing views do not take into account the international legislature which governs global commons (including space) matters, but that those views also lack the

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[184] Garcia 2021, p. 423.

[185] Baca 1993, p. 1047; Pershing 2018, p. 171.

[186] Garcia 2021, p. 423.

[187] Garcia 2021, p. 423.

[188] Garcia 2021, p. 423, p. 425.

[189] Garcia 2021, p. 423.

[190] Garcia 2021, p. 423.

assumption that there is also a drive for peace for the sake of co-existence between states.[191] Apparently there is a "prevalent" notion in international community that states compete for resources with military tools and are driven by their self-interests.[192] Garcia argues that the Outer Space Treaty is a part of the global commons law and that the treaty declares the global commons as "non-national".[193] She reasons that scholars with opposing view ignore the role of the states drive for peace, "epistemic communities" and the international law's restrictive effect.[194]

Garcia's arguments could be considered as representing a rather isolated and purely academic way of reflecting these matters. This sort of a secluded view comes partly up also in the text of Lisa Justesen, but Justesen also makes a distinction between different professional "suborders" and hence recognizes the symbiosis (or diorama as she herself explains) of different factors/suborders at play.[195] I argue that while Garcia's standpoint seems rather optimistic, Justesen's elaboration of different factors at play and her empirical data from International Telecommunication Union (ITU) and UN COPUOS seem more reasonable. I will return to this topic and data and open up Justesen's way of seeing these topics slightly more in the chapters five and six (conclusion).

4.2 Right to Self-Defence and Collective Self-Defence

A state's right to self-defence is another fundamental international legal doctrine that possesses a significant historical/legal heritage and bearing being simultaneously very closely related to the state's right to sovereignty.[196] The right is a part of the international customary law, but more importantly it is specifically mentioned as an exception regarding the prohibition against the use of force in the Charter 2(4).[197] The right for a state to defend itself is sometimes employed as a legitimatizing reasoning or as an excuse for a state to enhance its

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[191] Garcia 2021, p. 423.

[192] Garcia 2021, p. 425.

[193] Garcia 2021, p. 425.

[194] Garcia 2021, p.425.

[195] Justesen 2021, p. 1-19.

[196] Crawford 2012, p. 563-564.

[197] The Charter Art. 2(4).

military capabilities and in regards of the space warfare, this has inter alia resulted in states conducting the above-mentioned ASAT tests.[198] This doctrine is a fundamental right of a state, but it can also easily be seen that the states significantly investing in their defensive capabilities is a factor that is further raising the tensions in on the geopolitical arena and outer space. Again, we are talking about having a strategic and tactical balance, since defensive capabilities often have the potential of conducting offensive operations as well.

Naturally connected to the doctrine of self-defence is the concept of collective self-defence which has its legal basis on the Article 51 of the Charter.[199] Collective self-defence comes into question in situations where an attack occurs against a UN member State. Other treaties and organizations also have the concept of collective self-defence such as the North Atlantic Treaty Organization (NATO) and the European Union. Both organizations furthermore have Member States that possess at least some sort of space weapon capabilities. For example, it is mentioned in the Council of Europe's 2014 Fifth Revision of the "Code of Conduct for Outer Space Activities" that Earth-to-space and space-to-space weapons are allowed for the safety of the member states, stating that the use of these weapons could come into question in incidents requiring self-defence (or if there are human lives to be saved or forming of new space debris can be prevented.)[200] Thus one member state possessing space weapon capabilities could cause a conflict to spread to outer space if a non-space actor of the EU was to come under attack. The same holds true in regard to NATO member states: in the 2021 Brussels summit NATO disclosed that it faces more and more threats to, from and within the space setting and that the Article 5 of the Treaty could be invoked if such a threat came to be reality.[201] Additionally, NATO is widely prepared to other different space related scenarios as its 2021 Legal Gazette together with the space operations doctrines of both the United Kingdom and the United States clearly demonstrate.[202]

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[198] However, the United States recently declared that they will not be performing ASAT tests anymore in order to "promote responsible use of the space", homepage of the BBC https://www.bbc.com/news/technology-61151141.

[199] The Charter Art. 51.

[200] Harrison 2020, p. 5.

[201] Homepage of NATO https://www.nato.int/cps/en/natohq/topics_175419.html.

[202] NATO Legal Gazette 2021 https://www.act.nato.int/application/files/5716/4032/2170/legal_gazette_42.pdf.; additionally, I recommend seeing also: United Kingdom JDP 0-40 Space Power -doctrine,

Thus, since the weaponization of space with traditional weaponry is not banned (and bearing in mind that there is no consensus on the concept of a "space weapon"), state may currently have a somewhat legitimate basis for improving their defence capabilities in outer space. Again, geopolitical tensions and perceived threatening actions such, as the ASAT tests, lead to military preparations by states and an intensifying arms race to space. As for anticipatory and pre-emptive self-defence, Lyall and Larsen write that pre-emptive self-defence comes into question when there is a more of a general threat to a nation, while anticipatory self-defence relates to a specific event which creates a direct threat of armed attack.[203] Anticipatory self-defence is more often than not seen as a justified act,[204] however, for example Johanna Friman does an excellent job of delving in to the matters of various self-defence incidents and subgenres, while also offering opposing views on possible justifications in such circumstances.[205]

As an example of a more peace-oriented way of state action, Julia Balm mentions that the formation of the Defensive Space Strategy of the UK does not use language that speaks of domination and space security.[206] She argues that this shows commitment to the Resolution 7536 of the UN on Responsible Behaviours and also showcases that the language regarding defence is "critical" in abandoning rhetoric that is considered as "defence hostility", thus catering for space security.[207] As Dr Mark Hilborne has put it, "the more stable we make space, of course, then that has military pay-offs as well".[208] I will visit this topic more in the

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https://www.gov.uk/government/publications/uk-space-power-jdp-0-40.; United States JP 3-14 Space Operations -doctrine, https://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_14Ch1.pdf.

[203] Lyall – Larsen 2009, p. 504-505.

[204] Shaw 2021, p. 867-868.

[205] Friman 2017 p. 61-66, p. 170-177.

[206] The World We Got This Podcast by the Faculty of Social Sciences and Public Policy, King's College London 2022, at 24:50-25:08.

[207] The World We Got This Podcast by the Faculty of Social Sciences and Public Policy, King's College London 2022, at 25:08 and onwards.

[208] The World We Got This Podcast by the Faculty of Social Sciences and Public Policy, King's College London 2022, at 24:23-24:26.

later chapters of this thesis, but at this point it suffices to mention that due to to the war in Ukraine, this sort of a development can be seen as being sidelined.

Among other scholars, Justesen also mentions that the principle of self-defence has surfaced in discussions considering the international legislation regarding outer space.[209] (Collective) Self-defence is restricted by the Articles IV and IX of the OST as was previously stated.[210] However, according to Roxanne Pope, in the case of state's self-defence, it is unclear how "some treaty obligations" apply.[211] According to the Charter, use of force is generally prohibited[212], but there is also the UN Security Council's list of exceptions such as self-defence,[213] which also govern space weapons.[214] It should be noted that the right to self-defence is a part of international customary law, however, it can be exercised only until Security Council steps in.[215] When considering space weapons broadly, there also remain questions such as possible space debris and possible collective damage to nations not part of a war effort, among other things. Therefore, it can be seen that the right to self-defence is restricted by the principles of proportionality and necessity[216], of which especially proportionality could affect the space weaponry used in an act of (collective) self-defence. Regarding attacks performed by non-state actors, there seems to be uncertainty in the academic literature.[217] Furthermore, in the real-life political playground, Justesen notes that regarding The Committee on the Peaceful Uses of Outer Space (UN COPUOS) and her empirical studies related to the organization, while "NGOs, the UN COPUOS Secretariat and Chairs" keep working on the "peaceful and sustainable uses of outer space", the military

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[209] Justesen 2021, p. 137.

[210] OST Articles IV and IX; Hansen 2015, p. 49.

[211] Pope 2021, p. 301.

[212] The Charter 2(4); Pope 2021, p. 268.

[213] Pope 2021, p. 268.

[214] Hansen 2015, p. 31.

[215] The Charter Article 51; Additionally, it should be noted that if the UNSC authorizes a use of force -mandate, it prevails over restrictions set by other international legislation; Hansen 2015, p. 52.

[216] Shaw 2021, p. 861.

[217] Shaw 2021, p. 861.

suborder was silent on these matters.[218] She further explains that although the threat of an arms race to space has been mentioned in the 2019 UN COPUOS Report and that the military division is increasing its role in the emerging space order, "the military discourse is largely muted" concerning the discussion within the UN COPUOS.[219]

Lastly, regarding consultation and remediation, OST's Article IX has a consultation mechanism in case of "harmful interference".[220] If a state party believes that there might be a harmful interference, it has a right to request consultation.[221] Masson-Zwaan and Hoffman state that OST's Article IX's[222] consultation mechanism, IHL[223] and due regard principle of the Charter impose conditions on nations aspiring to use force in space.[224] However, they add that the Article IX of the OST might not be strong enough to enforce consultation in a real-life situation.[225] Chatterjee agrees, since for example contamination is not expressly sanctioned in the Articles of the Outer Space Treaty.[226] Considering purely the consultation mechanism, there is no official legal recourse for a third party state to lean upon if its peaceful use of a space asset is jeopardized.[227] However, the Article IX of the OST does mention the requirement of remediation of damage between the victim state and the launching state.[228] Again, we are facing the fact that space domain lacks generally a truly effective dispute settlement mechanism, a notion that has been brought up before and a situation that yet again highlights the intentional gaps in the space legislation.

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[218] Justesen 2021, p. 188.

[219] Justesen 2021, p. 190.

[220] OST Art. IX.

[221] OST Art. IX; Hansen 2015, p. 45.

[222] OST Article IX.

[223] API Article 35(3).

[224] Masson-Zwaan – Hofmann 2019, p. 46.

[225] Masson-Zwaan – Hofmann 2019, p. 21.

[226] Chatterjee 2014, p. 39.

[227] Hebert 2014, p. 31.

[228] Hansen 2015, p. 59-61.

4.3 Right and Drive for Appropriation/Acquisition of Territory

According to the Article I of the OST (the so-called freedom principle) "All states are free to explore and use outer space without discrimination, based on equality and international law".[229] However there are limits to this freedom, mainly the limitation that space activities should be conducted in a manner that is "for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development"[230], therefore forcing (at least on the paper) the nations to forgo their competition for resources in space.[231] Originally OST dictates that exploration of outer space is to be conducted on an "equitable basis" and that it "shall be the province of all mankind".[232] It further adds that no one shall claim jurisdiction, establish sovereignty or occupy any celestial body or any part of outer space in the Article II by declaring that "Outer space, including the moon and other celestial bodies, is not subject to national appropriation" (the non-appropriation principle).[233] Additionally it emphasizes the importance of cooperative exploration activities for maintaining peace and security[234] and lastly, it declares that the use of outer space should be "exclusively" peaceful, implying that weaponization would be against the norms laid out in the treaty[235] (these are also generally considered as being customary international law at this point). The treaty also presents a requirement to take the principles of cooperation and assistance into account, which could be interpreted as guiding the "conquesting" of outer space and celestial bodies.[236] The origins of the non-appropriation clause lie in the times that the OST was drafted, since it was feared that the two leading space nations, the US and the Union of Socialist Soviet Republics

[229] OST Art. I.

[230] OST Art. I.

[231] Chatterjee 2014, p. 29.

[232] OST Article 1.

[233] OST Article 2.

[234] OST Article 3.

[235] OST Article 4.

[236] OST Article 8.

(the USSR), could conquest territories on the celestial bodies (mainly the Moon in practice) and use them for military purposes.[237]

Generally, acquisition of territory/appropriation is a doctrine that has been widely accepted by the international law and community. In the modern world the acquisition of territory is almost of no relevance as practically all regions of the globe are either under the sovereignty of one of states or the domain is declared as so-called global commons[238], an area where no state sovereignty is recognized. Traditionally, the acquisition of territory may take place through five different methods i.e cession, occupation, accretion, subjugation and prescription. Of these, only occupation could be considered as a viable option in terms of outer space and especially the celestial bodies, however, the non-appropriation of these areas is clearly written in the Outer Space Treaty's Article II[239]. But, as has been previously mentioned, the technological development at both the state and commercial level enables the pursuit of the (natural) resources of the Moon and other celestial bodies. However, it is important to note that changing customary law in one direction or another would also be very difficult at this stage.

Additionally, we have to consider if the non-appropriation is only limited to the very establishment of sovereignty and hence the extraction of resources by private companies (among other things) is possible. Also, it must not be forgotten that the threat of space militarization by covert actions is strongly related to this matter. One has to bear in mind for instance that Russia and China have unveiled a plan to establish a "research station" on the surface of the Moon by the year 2025.[240] If we add to this the fact that several cooperation projects have been terminated due to increasing tensions, such as the Galileo-project,[241] and that there is the active collaboration of civilian and military resources through China's MCF, it is hard to believe that the gradual "exploratory" conquest of the Moon would proceed without conflicts, or that "exploration" is as innocent as it seems (the same goes to the

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[237] Pershing 2018, p. 154-155.

[238] Garcia 2021, p. 423.

[239] OST Article II.

[240] Homepage of the Foreign Policy https://foreignpolicy.com/2021/10/17/moon-base-china-russia-lunar-space-nasa/.

[241] Justesen 2021, p. 112.

Western actions, such as the previously mentioned Rolls Royce-case). In the end, the question is about the command of the so-called "space economy" and there is a race to control it[242] or at least to ensure the highest possible ranking of each nation in the outer space pecking order (my personal note). However, some academics have argued that the celestial bodies could remain a "common heritage of mankind", as already mentioned in relation to Denice Garcia and her text "Global commons law: norms to safeguard the planet and humanity's heritage."[243] Nonetheless, here we come to a familiar point, where I see that the war in Ukraine has practically ruled out this option for at least the next few decades, although in more peaceful times one could see more potential in her view.

In addition, some scholars have argued that first nations who take the initiative for appropriation should and/or will do so, which would lead to an unequal distribution of the territories of the celestial bodies and their resources.[244] One of the first persons to question the unambiguity of the Article II in the 1960s was Stephen Gorove, who raised the issue of not including private actors or international organizations in the Article II of the treaty among other things.[245] The commercial activities and potent space resources further encourage the states to focus on the militarization and weaponization of outer space. Rather importantly, Justesen brings forth the possibility of commercial interests and military suborder becoming intertwined, resulting in military operations being considered as a necessity and "energized" because of the protection needed to secure the market opportunities.[246] Garcia adds to this by by pointing out that attempts by developed countries to exploit the resources of outer space may harm future generations.[247]

Pershing also argues that there has been a shift in the stance towards the non-appropriation principle by the states, which according to her has been "unchallenged" by the states and

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[242] The World We Got This Podcast by the Faculty of Social Sciences and Public Policy, King's College London 2022, at 16:44-18:02.

[243] Garcia 2021, p. 424.

[244] Pershing 2018, p. 150.

[245] Gorove 1969, p. 349; Pershing 2018, p. 156-157.

[246] Justesen 2021, p. 235.

[247] Garcia 2021, p. 430.

"widely adopted.[248] She argues that the violation of the non-appropriation principle (regarding extracted space resources) can be seen to have started as early as 1969, when astronauts brought back lunar samples from their mission on the Moon. This, according to her, has during the following decades led to a "pattern of appropriation", reaching its current peak in modern times.[249] Her claims do have value, since the Moon agreement specifically denies "any part thereof or natural resources in place" on the Moon to be property of inter alia a state, and yet the actions of the United States were left unchallenged.[250] Additionally, regarding state practice, the change in US position can be seen in the Spurring Private Aerospace Competitiveness and Entrepreneurship (SPACE) Act of 2015, which effectively legalizes extracted space resources (space mining) for US private operators and inspires other countries to follow suit, as Luxembourg and the United Arab Emirates have done.[251] Justesen notes that the differences between the Moon Agreement and OST, "as well as the level of ratification contribute to uncertainty regarding the right to recover and use space resources", adding that space law experts such as Johnson[252] verify this claim.[253] These occurrences have a strengthening effect if this is seen as valid, creating thus *ius cogens* on the appropriation matters. Especially with regard to the *opinio juris* of legal scholars, Pershing states that there has also been a shift among them towards accepting the extraction of materials originating from outer space and celestial bodies, which is a significant change compared to the view of the drafters of the treaty and the scholars of the time.[254] What is the precise extent of the appropriation then, given the changing attitudes in the academic literature? In general, scholars have been restrictive in their views on establishing sovereignty in outer space or celestial bodies, including the examples that Pershing mentions such as Thomas Gangale, Marilyn Dudley-Rowley and Lawrence Cooper demonstrate: ownership of the extracted

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[248] Pershing 2018, p. 158.

[249] Pershing 2018, p. 158.

[250] Pershing 2018, p. 159.

[251] Pershing 2018, p. 159-160.

[252] Justesen 2021, 140-141.

[253] Justesen 2021, p. 140-141.

[254] Pershing 2018, p. 161; see also Bilder, Richard B., A Legal Regime for the Mining of Helium-3 on the Moon: U.S. Policy Options, 33 FORDHAM INT'L L. J. 2010, p. 243, p. 285-286.

resources is distinct from the ownership of "real property".[255] Pershing states that all these elements mentioned above together are a signal towards a slowly developed and adopted change in regard to the non-appropriation principle.[256]

Another topic we have to consider is the appropriation of *in situ* space property. I agree with Pershing that this sort of an appropriation is impending and is likely to be comparable to how the change in position on the non-appropriation developed with extracted space resources, at least for private actors, because she argues that the Article II does not implicitly prohibit this.[257] She bases her vision on the enormous financial incentives that space resources offer [258] to both private actors and nations.[259] She further argues that although the view of expanding the right of appropriation is currently in the minority this does not mean that it will not take place in the future.[260] Scholars such as Alan Wasser and Douglas Jobes further support this view by arguing inter alia that if the Article II of the OST is viewed through the doctrine of *expressio unius est exclusio alterius* (including one thing excludes the other), it renders it possible for private parties to appropriate since it is not explicitly denied.[261] Pershing adds that, according to a minority of scholars, this view can later be extended to non-governmental organizations and even states themselves, since the ambiguity of the Article allows states to interpret it freely and because customary international space law is seen as weak at the moment.[262] This further underlines the need to address the ambiguity of the Article II of the OST, because if left unaddressed, states could form a shift in international customary law[263]

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[255] Pershing 2018, p. 161-162; see also Cooper, Lawrence A., Encouraging Space Exploration Through a New Application of Space Property Rights, 19 SPACE POL'Y 2003, p. 111, p. 117.

[256] Pershing 2018, p. 162.

[257] Pershing 2018, p. 162.

[258] Commercial/state incentive is often mentioned in the related academic literature, for example Justesen 2021, p. 192.

[259] Pershing 2018, p. 167.

[260] Pershing 2018, p. 168.

[261] Pershing 2018, p. 168.

[262] Pershing 2018, p. 168-169.

[263] Which according to Justesen, is the way forwards as she had observed in the Legal Subcommittee of the UN COPUOS "Progress would happen through non-legally binding procedures that would possibly become binding or practice"; Justesen 2021, p. 144.

and continue with the intensifying appropriation measures, as was previously shortly touched upon.[264] However, it should be noted that states have currently complied with their obligations under the Article II of the OST, and neither private parties nor states assign ownership rights to celestial bodies, meaning that state practices support this part of the non-appropriation principle. Pershing argues that the majority of the legal scholars are seen to share this perspective, establishing their standpoints on the fact that either the Article II expressly prohibits even private appropriation or it is denied on the basis of the obligations imposed on states in the Article II, a claim that is (according to Pershing), supported by the arguments of Fabio Tronchetti and Virgiliu Pop or that customary law prohibits it, as Deva Prasad states.[265]

Considering all of the above, one can see that complete demilitarization/de-weaponization of space may not be possible because space exploration is so heavily dependent on military technology, not to mention military intelligence, making them virtually inseparable.[266] The militarization and weaponization also serve as a means to conquer and protect states' outer space resources and territories, which adds weight to the repeatedly emerging fact that international law is in dire need of updating [267], especially given the current geopolitical tensions. This does not mean necessarily that the appropriation should be banned entirely, since there are enormous practical and potential benefits in capitalizing the resources of outer space and celestial bodies. The academic literature has discussed possible ways to solve appropriation issues, the suggested solutions including the aforementioned principle of whoever is first in has the right to appropriate, equal division of resources, leasing[268] of outer space territories, amending the OST[269] and other suggestions lying somewhere between all of these.[270] It can be seen that states and their interests dictate the direction in which

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[264] Pershing 2018, p. 163.

[265] Pershing 2018, p. 165; Prasad 2018, p. 152.

[266] Taft 2017, p. 372.

[267] Pershing 2018, p. 170.

[268] See Williams, Marcel F., Leasing the Moon, NEW PAPYRUS (Feb. 3, 2017), http://newpapyrusmagazine.blogspot.com/2017/02/leasing-moon.html.; Pershing 2018, p. 172.

[269] Pershing 2018, p. 177.

[270] See Buxton 2004, p. 689; Cooper 2003, p.111, p. 117; Pershing 2018, p. 171; Here it should be noted that Justesen argues that there was “no indication of the creation of new treaties” in the political suborder and that the

international legislation or international customary law is going to be developed in regard to acquiring outer space and celestial territories. The states possess some differing interests, but mainly the commercial and military interests of each state and its potential adversaries take priority here. It is also easy to argue that the conflict in Ukraine will have an impact on the competition to control and conquer space-based resources. However, in the next chapter, I will argue that it may not be so simple, since the increasingly complex expansion of humanity involves a large number of variables that lead to other factors and actors that, via a form of symbiosis, will affect the future of the outer space order.

"substantial negotiations, formulations or shared understandings" were nowhere to be seen; Justesen 2021, p. 149.

5 Terrestrial and Outer Space Power Dynamics: the Emerging Outer Space Order, Grey Zone Activities and Private Actors

5.1 Scientific and Legal Suborders

Here I will delve into the discussion of the possible outer space order, which is in direct relation to the militarization and weaponization of space. As has been mentioned, it also includes other variables that must be taken into account and henceforth we have to widen our narrative a bit. I will lean heavily on the writings of Denise Garcia and Lisa Justesen while also bringing some academic support, variety and critique to the views of the aforementioned authors. I will provide interesting, concrete examples of the subjects of the grey zone activities and private actors having an effect on the geopolitical playing field and thus directly and indirectly to the militarization/weaponization of space in a more detailed way.

Denise Garcia argues that the absence of conflict in the global commons (including outer space and celestial bodies) is partly the achievement of the international legislation and principles, the implementation of the international treaties through diplomatic practices and the "overlapping global governing arrangements".[271] She sees that this global commons law helps to avoid conflicts and furthers international cooperation by performing as a "guardianship for the future generations", creating "a comity for peace and peacefully settling disputes" and "setting norms as the foundation for peaceful relations".[272] This in turn, among other things, "forms a common ground for peace and cooperation", thus preventing "future harm", which she sees as opposing the viewpoint of the realists[273], who are not as optimistic as Garcia in their views.

These alternate, realist views tend to lean to the more traditional stance of seeing outer space as a continuum of the terrestrial power dynamics. But as Lisa Justesen of the University of Lund/Swedish Defence University brings forth, it could also be that the emerging political order in outer space will be heterarchical, which means (among other things) that the balance of power in space dictates international relations on Earth, in contrast to the more traditional

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[271] Garcia 2021, p. 438.

[272] Garcia 2021, p. 438.

[273] Garcia 2021, p. 438-439.

view of seeing the causal relation being the opposite.[274] There is also criticism of this kind of view in the academic literature, as Bleddyn Bowen, among others, is skeptical of the idea that control of outer space could lead to domination on the terrestrial level.[275] In her work Justesen refers to how world politics is becoming increasingly hierarchical and heterarchical at the same time, reflecting well the current geopolitical situation and the possible change in the hegemonic position of the United States as the world's political leader.[276]

However, Garcia's view is that the shift towards the protection of the human race and the global commons resonates with a recent shift in the international legal structure, in which "human security" and human "privileging" have increased their role at the expense of entirely "state-centric" legislation."[277] She continues that this shift is transformational and part of a "humanity-centered global legal turn".[278] She sees that the four fundamental principles (common heritage of humankind, common concern of humankind, intergenerational equity, precautionary action) strengthen the effectiveness of the global commons law and that these principles could serve as a guide in the midst of intensifying global tensions. The justification and basis have been laid in the international treaties (such as in the OST) and "ground-breaking conceptual ideals that benefit all humanity on a more equitable basis".[279] She emphasizes the importance of the "common heritage of humankind" (CHH)/"common province of mankind"[280], a phrase so familiar from the OST and the Moon Agreement, while Kemal Baslar's work offers support when he writes that the CHH is "one of the most remarkable developments in international law".[281] CHH is seen to consist of five parts: no one can claim jurisdiction, all states must support efforts towards common governance which will

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[274] Justesen 2021, p. 5.

[275] Justesen 2021, p. 232 especially footnote 253.

[276]Justesen 2021, p. 36-37.

[277] Garcia 2021, p. 428-429

[278] Garcia 2021, p. 428-429; Additionally, see inter alia Teitel, Ruth, Humanity's Law, (Oxford: Oxford University Press), 2011 and Trindade, Antônio Augusto Cançado, International Law for Humankind, 2020; In regard to academics, Justesen seems to agree, stating that scientists generally tend to abandon the "modern state-centric order" in regards of the emerging outer space order; Justesen 2021, p. 210.

[279] Garcia 2021, p. 429; Joyner 1986, p. 190-199.

[280] OST Annex.

[281] Garcia 2021, p. 430.

include the interests of the developing countries, the benefits of the resources shall be distributed to all states under a common authority that will act as a dispute settlement forum, exclusive peaceful usage of these domains (no weaponization or testing of weapons, however, note that this does not apply to militarization[282]) and finally that scientific efforts should be cooperative, transparent and findings should be shared to benefit all of humankind.[283] Garcia refers to Trindade[284] regarding the common concern of humankind, explaining that the common concern consists of six elements, of which the element of emphasizing "the human protection and not inter-state relations and interests" is the most relevant concerning the subject-matter.[285]

Regarding precautionary principle, Garcia states that although it was originally related to environmental issues from 1992 onwards, it has been applied in other areas of "scientific and global cooperation", such as disarmament.[286] She emphasizes its role in providing a working framework for future problems that may prove quite significant[287], such as in the case of debris-causing space weapons and other space weapons technologies. In the EU, the precautionary principle has been adopted by the member states and it may be invoked if "a phenomenon, product or process may have a dangerous effect, identified by a scientific and objective evaluation, if this evaluation does not allow the risk to be determined with sufficient certainty".[288] Garcia argues that this exemplary implementation of the principle by the EU reinforces the effectiveness and status of the principle in the international legal system and thus the framework it provides could act as a foundation for the development of the global commons management.[289] One can see some ground in Garcia's views, but I would argue that they are quite optimistic about the interests and motives of states, even if viewed before the

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[282] Garcia argues that outer space has been militarized, but not necessarily weaponized; Garcia 2021, p. 423.

[283] Garcia 2021, p. 430.

[284] Trindade 2020, p. 351.

[285] Garcia 2021, p. 435.

[286] Garcia 2021, p. 436; Lesley 2006, p. 459-528.

[287] Garcia 2021, p. 436.

[288] Garcia 2021, p. 436.

[289] Garcia 2021, p. 436.

current geopolitical climate/developments. I will return to this perspective later in the conclusion.

Justesen seems to share this opinion, at least partially, as she argues that states will not necessarily define the future political order, but it will rather be done by "quantum-mind entangled professional orders", which consist of "like-minded" professional members from all around the world."[290] These orders can be military, scientific, commercial[291], political or legal[292] and she argues that they will fill "the global spaces opening outside the formal political stagnated suborder"[293], such the empty gaps left by the "stagnated" UN COPUOS in the related political playing field. She states that the contemporary political structures uphold the traditional "world order surface from above", but that the professional orders "define" and "propel" the direction of the world order.[294] She adds that different professional suborders have different importance depending on times and suggests that in the first space age, for example, political and military suborders defined the "diorama" of the political space order.[295]

More specifically, Justesen sees that the scientific and legal suborders share Garcia's human-centric approach[296], but as we discuss this more later on, the military, commercial and political suborders may not necessarily do so. The militarization and weaponization of outer space do not only develop within the circle of military actors, but is part of a larger sphere, which also includes the scientific and legal communities. It is important to note that researchers in the related literature tend to be more concerned with space armament; for

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[290] Justesen 2021, p. 5.

[291] Justesen argues that these first three suborders are especially influential; Justesen 2021, p. 5.

[292] Justesen 2021, p. 15.

[293] Justesen 2021, p. 6.

[294] Justesen 2021, p. 49.

[295] Justesen 2021, p. 61; On p. 203 is also an interesting illustration of the diorama of outer space order by Lisa Justesen, which the author recommends examining since it helps to understand Justesen's train of thought regarding the dictating of the outer space order.

[296] Justesen 2021, p. 156, p. 158.

example, Natalie Bormann states that "[the] perpetuation of outer space of permanent war and its claims to weaponization will soon make no intervention possible".[297]

If we continue strictly with the legal suborder, Justesen states that its role has been weak in recent years and is diminishing in the diorama, noting however that its mere existence does "uphold critical stability and normality" in the emerging outer space order".[298] She makes a distinction between the "traditional lawyers" and the "space law experts", strongly criticizing the former type of a lawyer; according to her, these types of lawyers are directionless, strikingly text-bound and stuck in interpretation.[299] She substantiates this with empirical research that she conducted in the Legal Subcommittee of the UN COPUOS, adding that the lawyers lean on the individualistic side (eminently vigorously) in the "emerging outer space order", leading to a "lack of rationale for reaching a consensus" in the fear of less need for their "expert opinion and status".[300] She claims that these lawyers lack drive and feel that their very presence is enough, leading to an impression that "creating possibilities seemed to be far outside the responsibility of the legal suborder"[301]. It should be noted that she does single out and give credit for Alexander Soucek for his efforts[302] and she also notes that the mere existence of the committee is crucial to the developing outer space order.[303] She states that all the before-mentioned matters that she observed in the UN COPUOS may demolish the "belief in rule of law as an ordering principle".[304]

As Lyall and Larson have put it: "In space we seek the 'rule of law', not 'rule by law' where rules are simply adhered to when convenient to the powerful and altered at their behest."[305] Justesen also sees that the rule of law has been questioned and challenged in relation to outer

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[297] Bormann – Sheehan 2012, p. 89; Justesen 2021, p. 232 especially footnote 253.

[298] Justesen 2021, p. 208-209.

[299] Justesen 2021, p. 134.

[300] Justesen 2021, p. 134.

[301] Justesen 2021, p. 135.

[302] Justesen 2021, p. 135.

[303] Justesen 2021, p. 144.

[304] Justesen 2021, p. 137.

[305] See Lyall – Larsen 2009, p. 560; Justesen 2021, p. 137.

space.[306] As was also previously briefly mentioned, Garcia provides a valid point suggesting that the UNCLOS could set an example in regard to the outer space legislation, a thought that seems reasonable, for lawyers at least, since UNCLOS is rather broad in its scope and widely ratified, except by for example the United States (which is bound to many parts of the Convention due to those parts being considered as customary international law at this point). Roxanne Pope presents the view that peacetime testing of space weapons and their potential use in conflict situations undermines the commercial and scientific efforts in outer space and celestial bodies.[307] She further states that the weaponization of space should be controlled in times of peace so that we have the necessary legal framework to resort to in times of space warfare.[308] As Justesen points out (especially regarding the space debris), the legal suborder (such as the Legal Subcommittee of the UN COPUOS) could steer the change in the mindset of new (and existing, my personal note) actors in outer space to be "socialized into the nomos of orbits", so that clear responsibilities would be formed.[309] I argue that in this way the legal professional order could be seen taking a proactive role, rather than staying in their narrow line of focus and reacting only when necessary. This idea could well be extended to also cover various aspects and political procedures regarding the weaponization and militarization of outer space. Naturally it is in the interests of states to keep their capabilities secret, but such a legislative effort would produce some kind of a result that could maintain and encourage the dialogue between space nations. However, she notes that in the space law symposium of the Legal Subcommittee of the UN COPUOS the focus was on the topics of the regulation of microsatellites and space debris.[310] She remarks that the officials and diplomats were distracted and absent, adding that there was discussion about the worrisome "future developments" in outer space, but that it was also mentioned that necessary regulation will probably ensue only after an incident or an accident.[311]

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[306] Justesen 2021, p. 138.

[307] Pope 2021, p. 301.

[308] Pope 2021, p. 263.

[309] Justesen 2021, p. 140.

[310] Justesen 2021, p. 139.

[311] Justesen 2021, p. 144.

As I have mentioned before, I tend to lean towards the legal realist approach and see Garcia's standpoint as rather optimistic or purely academic, isolated from other factors at play, while Justesen brings forth various actors in a broader sense. I also argue that there is a kind of dysfunctionality in the sense that for example the legal experts in the UN COPUOS and academic scholars recognize the need for clearer regulation, but at the same time the states and their political, military and commercial interests drive the need to preserve the different gaps, conflicts and ambiguities in the international space legislation. Therefore, in this symbiosis we can see different factors and suborders working towards the same goal, but more importantly, different factors/suborders are simultaneously pulling in different directions, and thus maintaining the vagueness of the space legislation. This (intentional) dysfunctionality can best be demonstrated by the aforementioned PPWT and different codes of conduct, since they include both positive trends (the issues are discussed and regulated at least on some level) and negative trends (states trying to affect the capabilities of their adversaries while strengthening their own military capabilities) that are simultaneously driven by different suborders, which may even be represented by the same state.

5.2 Political and Military Suborders, Grey Zone Activities

Justesen sees that the current "form of governance is outpaced due to the de-synchronization of politics", which has a strong impact on the world order.[312] There have been arguments such as those of Raymond Duvall and Jonathan Havercroft claiming that the US has so-called "space supremacy" which poses a threat to all people, possibly affecting the global political order.[313] They continue to argue that the "…space-weaponization is a material manifestation of Hardt's and Negri's idea of imperial sovereignty as de-territorialized and boundary erasing" because the "space-based empire would possess sovereignty over the entire globe".[314] Generally, according to Justesen, space politics have received little attention.[315] As was mentioned before, she argues that instead of mirroring the terrestrial political order to space, the space actually determines the politics on Earth.[316] According to her the emerging

[312] Justesen 2021, p. 225-226.

[313] Justesen 2021, p. 4.

[314] Justesen 2021, p. 232.

[315] Justesen 2021, p. 3-4.

[316] Justesen 2021, p. 5.

outer space order will be heterarchical, meaning "multiply ranked orders" which have previously been "used to describe early modern orders and historical transition phases".[317] She further clarifies that by heterarchical she means that "political structures are conceived of as processes unfolding in a political space in which authority fluctuates".[318] Justesen argues that diplomats are not "typically socialized into the space community" and "appear to be detached from the work and knowledge exchange" considering the UN COPUOS.[319] She admits that, on the other hand, being present at all can be a sign that the issues under discussion are seen to have some importance, [320], which reflects the positive side as well as the dysfunctionality I previously brought up. Justesen also states that the political suborder avoids questions regarding outer space, but when they receive attention, the political suborder tends to tie them to the international order that is prevailing on Earth.[321] She further adds that there was "a sense of pessimism and concern" among the political suborder and that there is a tendency to rely on traditional ways of dealing with space related issues, meaning inter alia giving priority to terrestrial level "weapon reduction agreements and regimes".[322] She continues that generally the political subdivision did not seem to share the legal suborder's concerns about space debris[323], which I argue can once again be seen to highlight the dysfunctionality between the different suborders.

Regarding the military suborder, Justesen argues that it represents the "pessimistic perception of a new ´great power game´".[324] It appears that the militaries of nations have begun to recognize space as a warfighting domain[325], which has displaced the initial, more general

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[317] Justesen 2021, p. 5.

[318] Justesen 2021, p. 40.

[319] Justesen 2021, p. 177.

[320] Justesen 2021, p. 177.

[321] Justesen 2021, p. 146-148.

[322] Justesen 2021, p. 147.

[323] Justesen 2021, p. 148.

[324] Justesen 2021, p. 6.

[325] Justesen 2021, p. 116.

discussion of outer space as a force multiplier or enabler.[326] Furthermore, the legal and the political suborders are pushed aside even if formally it appears that the political suborder has the authority, because Justesen claims that there has indeed been a recent rise of the military suborder.[327] She sees that "for the political suborder the construction of outer space and critical issues are strongly influenced by the military and the commercial suborders."[328] Justesen also notes that actors in both of the latter suborders want to establish themselves the first or among the first in outer space (motivated by the pursuit of resources, monetary wealth and strategic high ground)[329], which creates pressure on the political sphere and actors. Justesen adds that the way the senior military leaders brief the political suborder in the spirit of "the balance of power interplay" prevents the political subdivision from seeking alternative ways and "establishing an overarching outer space order."[330] Furthermore, she adds that in the military suborder "there were internally transmitted military strategies that aimed to shape the future."[331]

Refreshingly there is also an example of a state working actively towards controlling the outer space setting - the United Kingdom (UK), as the "UK has been on the vanguard of establishing international policy on space in the UN" 2020 resolution on Responsible Behaviour in Space which has led to other Resolutions in specific aspects of space.[332] However, although this kind of development seems positive, again the interests of the nation play a role here: it is estimated that approximately 90% of the United Kingdom's military capabilities are reliant on space in some way or other.[333] The United Kingdom's close ally, the United States and its military, are also highly dependent on space resources, which can be

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[326] Justesen 2021, p. 207 especially footnote 232 where Justesen states that through for example electromagnetic spectrum related works, the scientific suborder and military suborder form an "unspoken alliance".

[327] Justesen 2021, p. 202.

[328] Justesen 2021, p. 149.

[329] Justesen 2021, p. 155.

[330] Justesen 2021, p. 156.

[331] Justesen 2021, p. 157.

[332] The World We Got This Podcast by the Faculty of Social Sciences and Public Policy, King's College London 2022, at 23:21-23:37.

[333] The World We Got This Podcast by the Faculty of Social Sciences and Public Policy, King's College London 2022, at 4:24-4:32.

seen as an advantage but also a vulnerability for the US.[334] According to Dr. Mark Hillborne of the King's College in London, strength in outer space also holds a significant symbolic value to the US.[335] Sofie Antrobus mentions "Open Ended Working Group" (OEWG) under the UN promoting transparency, norms of responsible behaviour in space, even defining what constitutes unsafe conduct.[336] Julia Balm argues that legislatively we need to go beyond the Outer Space Treaty: the proliferation of dual-use space activity and diverse actors together with the commercial and security related realities in space "heighten threats and vulnerabilities in ways that the OST does not address."[337] She's optimistic on the UN 7536 OEWG, seeing that it is effective in regard to norms, trust and confidence building measures.[338] However, a wider, successful cooperative effort towards this kind of collaboration in the present moment is yet to be seen and again, due to the Ukraine war, not very probable in the near future either.

Regarding the military operations of states in this judicial/legislative vacuum of international space legislation, it is important to take a short look on the phenomena of the grey zone activities. This term refers to actions such as China having its Military-Civil Fusion that has already been briefly processed in previous chapters. However, the term can be seen to include also other activities: as Gleason and Hayes have put it, the grey zone operations are tactics where objectives are met through use of force or other means while "staying below the threshold of a conventional war"[339] and by far the most common way to carry out these activities is through the use of satellites. I argue that it is obvious that the satellites are used inter alia for GPS (Global Positioning System) and communications in the military setting, but intelligence gathering, espionage etc. are an integral part of the grey zone use of satellites.

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[334] The World We Got This Podcast by the Faculty of Social Sciences and Public Policy, King's College London 2022, at 15:47-15:57.

[335] The World We Got This Podcast by the Faculty of Social Sciences and Public Policy, King's College London 2022, at 16:05-16:35.

[336] The World We Got This Podcast by the Faculty of Social Sciences and Public Policy, King's College London 2022, at 29:36-30:24.

[337] The World We Got This Podcast by the Faculty of Social Sciences and Public Policy, King's College London 2022, at 30:32-31:36.

[338] The World We Got This Podcast by the Faculty of Social Sciences and Public Policy, King's College London 2022, at 30:32-31:36.

[339] Gleason – Hays 2020, p. 8.

It is, however, important to keep in mind that although satellites can be used in grey zone activities, there is a consensus on the international level that they are *not* considered to be space weapons, though they are probable targets of these weapons systems. Gleason and Hayes argue that leaving room for grey zone activities encourages using these tactics, which in turn leads to the weakening of the deterrence effect and disrupts the ”strategic stability”[340], which is a view that is easy to agree with. However, I personally see that whatever the legislative situation is, there are *always* grey zone activities taking place either on the terrestrial level or in space. During conflicts and times of peace, states throughout history have attempted to gain upper hand in the geopolitical playground through ambiguous actions and no amount of legislation will magically change that. However, improved legislation can minimize the scope of the grey zone activities, while providing an internationally accepted justification for retributive actions, such as the previously discussed (collective) self-defence.

As of the on-going conflicts, Russia’s Wagner group is a perfect example of a private military company acting on behalf of the state government, doing the so-called ”dirty work”. At the same time, China’s Military-Civilian fusion apparently already has some space elements to it, while their operations performed by their fishing vessels in the South China Sea can be seen as a perfect example of MCF activities on the terrestrial level. Bearing these examples in mind it would be naive to assume that space would make an exception as a dimension for these kinds of operations and therefore this is also something we should be legislatively prepared for. Yet, legislating the participation of private actors in space warfare is riddled with problems. The famous Stuxnet-case[341] exhibits one of those major concerns, as it shows how impossible it is to control and legislate the capabilities of even small-scale private, technically skilled individuals who are operating with their own privately owned computers from the comfort of their homes. This is only one of the problems related to these actors and this thesis is far too narrow in scope to explore these problems in depth.

Lastly, Justesen mentions Erik Brattberg and his colleagues who state that “our inability to see” (referencing to our “dependence on interlinked material systems and flows”) is the most

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[340] Gleason – Hays 2020, p. 8.

[341] Homepage of Forbes https://www.forbes.com/2010/10/06/iran-nuclear-computer-technology-security-stuxnet-worm.html.

important security concern that we are facing.[342] She also states that "when a fear-based world" is entered in a geopolitical sense, it creates a security dilemma that results in escalatory measures where "the means nor the ends of the conflicts are constrained by norms".[343] Masson-Zwaan and Hoffmann explain that when the current legal international framework regarding space militarization/weaponization was established, the states were not able to imagine the future possibilities of space warfare[344] and they are not able to do that now either, as Hebert points out.[345] Garcia argues that the regulatory framework requires updating and that "novel approaches" are needed in interstate diplomacy.[346] All this academic discussion supports the observations I have brought up in different parts of the thesis, mainly that fear in the geopolitical field leads to further rearmament, that the international regulatory framework is not up to par and that new, novel approaches are desperately needed in the field of politics in order to have stability and predictability in the outer space setting.

5.3 Commercial Suborder and Private Actors

It is important to note that Justesen sees that the commercial suborder, unlike the political, is independent, but that both also represent the elite of society.[347] Katrin Nyman-Metcalf suggests that interstate relations could be managed through "instant customer law"[348] that would have its basis in the space treaties, while the commercial activities could be self-regulated, meaning that subjects or peers regulate their matters through a regulatory body, further noting that self-regulation is better than no regulation at all.[349] However, Justesen notes that instant customer law would enable the strongest to determine the law[350], a view that is easy to agree with. Additionally, Tronchetti states that if there are differences in the

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[342] Justesen 2021, p. 21.

[343] Justesen 2021, p. 231.

[344] Masson-Zwaan – Hofmann 2019, p. 46.

[345] Hebert 2014, p. 4.

[346] Garcia 2021, p. 423.

[347] Justesen 2021, p. 204.

[348] Nyman-Metcalf, 2017 p. 268; Justesen 2021, p. 138.

[349] Nyman-Metcalf, 2017 p. 268, p. 275; Justesen 2021, p. 138.

[350] Justesen 2021, p. 138.

domestic legislation concerning the outer space (and celestial bodies) issues, private companies may succumb to forum shopping in order to pursue their interests and the resources.[351] Thus it could be stated that commercial actors have least partial control over the political suborder, though again, the geopolitical tensions have tipped the scale and continue to do so at the present time.[352] The establishment of an International Outer Space Authority has also been suggested as a solution in the related academic literature.[353] This reflects partially the academic views demonstrated earlier, such as Denise Garcia's suggestion of UNCLOS setting an example for space legislation. Despite this, such an organization has not garnered extensive support and thus seems to be still largely a scientific idea at this point. Additionally, in the current geopolitical climate even a thought of such an organization seems impossible. Still, the fact remains that the commercial sector requires an international rulebook, which in turn would affect the space militarization and weaponization.[354]

We must also take a short look at the private (civilian) actors/organizations with connections to the space militarization/weaponization. The most obvious example of such a person is the founder of the SpaceX, billionaire Elon Musk. Now it must be remembered that we are still in the early stages of private enterprises operating in space, but nonetheless this is connected to the topic, as Musk for example provided Ukraine with SpaceX's Starlink-satellites[355] in the early days of the war in Ukraine.[356] This support is still ongoing and can be considered a ground-breaking event (at least in the Finnish tabloid press, which also shows the increase of interest by media and laymen in space related matters), since this marks the first time that a private person/company has taken such a direct, partisan action in the space setting, intervening directly in a military conflict.[357] Another organization that also took a biased

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[351] Tronchetti, 2013 p. 82; Justesen 2021, p. 138.

[352] Justesen 2021, p. 149.

[353] Pershing 2018, p. 174.

[354] The World We Got This Podcast by the Faculty of Social Sciences and Public Policy, King's College London 2022, at 09:00 and onwards.

[355] Justesen 2021, p. 217: An example of Justesen's claim of commercial suborder affecting the political reality before the political suborder reacts to a given situation.

[356] Homepage of Reuters https://www.reuters.com/technology/musk-says-starlink-active-ukraine-russian-invasion-disrupts-internet-2022-02-27/.

[357] Homepage of the Finnish tabloid Iltalehti https://www.iltalehti.fi/ulkomaat/a/cea8ef17-018b-4188-940f-face72346767.

action was Google when it temporarily turned off live traffic updates in Ukraine in order to avoid the locations of troops and refugees being revealed. [358]

Cyber warfare is a second topic that has connections to both private actors and the space framework. The actions of Anonymous in the Ukraine war have once again brought the attention of the world to this organization and its attacks, this time against the oppressor Russia. Due to the fog of war and propaganda from both the Russian and Western media outlets, it is difficult to obtain absolutely certain information about these attacks. However, Anonymous has claimed that the hacking group ”NB65” (”Network Battalion 65”), which is closely connected to the organization, had launched a successful attack against Roscosmos, the Russian state corporation responsible for its space activities. [359] The attack allegedly had an effect on Roscosmos’s ability to communicate with their military satellites in orbit, affecting their satellite imaging and vehicle monitoring systems.[360] If we compare this attack to the previously mentioned Stuxnet-attack,[361] where a computer worm allegedly created by the US and Israel, destroyed several Iranian nuclear power plant centrifuges, we can see a lot of potential for destruction. While there have been no known and confirmed cases of a similar impact on any country's space resources, there are clear indications of the ability to do so. The problem is multiplied when we take into account that today such capabilities may even be within the reach of individual actors, as the case of the Anonymous has shown. In addition, according to Julia Balm of the King’s College in London, inexpensive jamming and spoofing technologies are widely available to ”hackers, governments and criminals”.[362] Although these examples are rather rare at this point, these cases clearly demonstrate the capability of private companies and individuals. Regarding the Stuxnet-example, it is gravely important to also

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[358] The World We Got This Podcast by the Faculty of Social Sciences and Public Policy, King’s College London 2022, at 8:34-09:00.

[359] Homepage of the Independent https://www.independent.co.uk/tech/anonymous-hack-russia-space-agency-roscosmos-b2026574.html.

[360] Homepage of the Independent https://www.independent.co.uk/tech/anonymous-hack-russia-space-agency-roscosmos-b2026574.html.

[361] Homepage of McAfee https://www.mcafee.com/enterprise/en-us/security-awareness/ransomware/what-is-stuxnet.html.

[362] The World We Got This Podcast by the Faculty of Social Sciences and Public Policy, King’s College London 2022, at 15:15-15:21.

emphasize the fact that the attack caused unintended collateral damage - a fact that has significant implications in space setting.

5.4 The Future Outer Space Order, the Shift Towards Heterarchy and its Effects on the Terrestrial Order

The previously partially mentioned empirical findings by Justesen from the International Telecommunication Union (ITU), UN COPUOS and NATO[363] indicate high level of fragmentation between the suborders. These suborders tend to be scattered, staying in their lanes as well as "hardwired by their professional identities and surprisingly stereotypical", thus creating a situation where the emerging space order is defined "within the separate suborders" working simultaneously.[364] This results in a view that there will be an upcoming heterarchical order in which "the horizontal power-sharing and internal hierarchies are strong"[365] and this might be a standpoint that most closely resembles the future space order, whether we consider the current situation or the future (it should be noted that naturally some of these suborders are more closely connected to each other than others).[366]

An example of suborders acting together[367] is the cooperation between the commercial, political and legal suborders, driving the utilization of space resources while having an effect on the terrestrial and outer space political playground, possibly shaping and molding the international legislation and customary law. Justesen uses "political decay" as an insight to explore the "contemporary world order", which she argues is "partly about the decline of the liberal world order", affecting our ability to "overview" and "coordinate".[368] She emphasizes that this way the focus is to find "structural and representational possibilities for dialogue as well as for alternative visions."[369] Justesen makes a reference to Björn Badersten's argument that "information and knowledge are central for any social order to overcome distrust and for

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[363] Justesen 2021, p. 201.

[364] Justesen 2021, p. 209.

[365] Justesen 2021, p. 201.

[366] Justesen 2021, p. 209.

[367] Justesen 2021, p. 132.

[368] Justesen 2021, p. 9.

[369] Justesen 2021, p. 11.

addressing collective challenges."[370] But again, it is important to keep in mind that there is also purposeful fragmentation and dysfunctionality, which is connected to the existence of the (intentional) gaps, conflicts and ambiguities in the outer space legislation.

Regarding purely UN COPUOS, Justesen states that there was no real leadership by the states and the "state power" did not leave any room for new ideas.[371] Regarding the fragmentation, she continues that there seems to be tension between the scientific and political suborders, hinting that the interests of states ultimately guide the discussion.[372] She argues, based on her empirical studies, that there are mentions of an "arms control free environment" in regard to outer space, which she brings up as a rather concerning and dangerous way of thinking, implying again that there is a change "from the predictable world order as we knew it".[373] It should be noted that Justesen also specifically states that during uncertain times, the heterarchical system fluctuates and the state-centricness takes over[374], of which the COVID-19 crisis and the Ukraine war are the most recent examples. She however emphasizes that the change is happening in the other professional suborders simultaneously, making a reference to Donnelly and noting that the "state-system" is giving way to the heterarchic overlay.[375] The military suborder is strengthening its position which greatly underlines the significance of diplomatic means and arms control in order to avoid miscalculations which could lead to escalation and space war.[376]

As has been discussed here, the commercial, political and military sections have taken precedence in the recent geopolitical climate and it can be argued that they have ever more solidified their effect on world politics since the dawn of the Ukraine war. The rise of these suborders together with the rising commercial interests (for resources and appropriation) and military interests (for self-defence, resources and appropriation) and the ineffective, outdated

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[370] Justesen 2021, p. 45.

[371] Justesen 2021, p. 181.

[372] Justesen 2021, p. 177.

[373] Justesen 2021, p. 219.

[374] Justesen 2021, p. 214.

[375] Justesen 2021, p. 214.

[376] Justesen 2021, p. 232-233.

and insufficient international space legislation leaves room for states to operate on the fringes of that legislation, leading to grey zone activities and private actors increasing their significance on the geopolitical field. As a real-life concrete example of this, we have briefly looked at examples involving both states and private actors and the effects of their actions on geopolitics and also on the fragmentation and dysfunctionality of different suborders. I find that Justesen's claim of the "quantum-mind entangled professional orders" may apply in a wider sense during peacetime and in the long run, but it is refreshing to see that she acknowledges in her diorama the fluctuation of importance between the different suborders. Although the commercial, military and political interests dictate the discourse currently, it should however be noted that the academic and scientific communities work while the current conflict goes on and they will continue to do so after the "hot" conflict ends; here it is important to remember that the conflict may also be frozen, changing its nature from "hot" to "cold", continuing the situation while changing its nature at the same time. But, although Justesen argues that "the most important general finding from my research is that it does not appear to exist a fundamental drive for interaction between suborders", she highlights the importance of that very interaction in "establishing a sustainable outer space order".[377] She emphasizes that the political suborder should be the one to define the development, and yet, it is "strikingly absent" from the important forums where this work could be done, probably because politicians/diplomats are occupied with terrestrial, more familiar concerns.[378] Furthermore, considering the efforts regarding legislation, I share Roxanne Pope's view - the issue is rather that the extent of nations' capabilities to militarize/weaponize space should be the subject of discussion and regulation rather than the complete demilitarization of space.[379] Next, we will review all of the topics discussed above as we move to my conclusions regarding the failed pacification of outer space and celestial bodies, the potential justifications and rationale for the militarization and weaponization of space, and how the surrounding professional framework and geopolitical reality play into all of this.

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[377] Justesen 2021, p. 196; The World We Got This Podcast by the Faculty of Social Sciences and Public Policy, King's College London 2022, at 35:09-36:00.

[378] Justesen 2021, p. 198.

[379] Pope 2021, p. 265.

6 Conclusion

Considering my first research question, there are currently numerous gaps, conflicts and ambiguities in the international space legislation, which then results in the discussed dark sides, blind spots and unintended/intended consequences. Ranging from the very fundamental loopholes such as the exact boundary between the national airspace and outer space to more "specific" ambiguities as well as to whether for example a space-to-Earth jammer should be considered a "space weapon", these gaps, conflicts and ambiguities legislatively leave plenty of room for improvement in the international space legislation. The loopholes can also be seen to diminish the credibility of the system of international law as an institution, as has been academically argued and demonstrated in the previous chapters. This results in the fact that the total pacification of outer space and celestial bodies has failed, whether or not that was the ultimate intention in the first place. The originally ambiguous and outdated five space treaties (among all the other space related agreements, conventions and codes of conducts) make it possible to interpret and bend the Articles and other rules of the treaties, thus possibly enabling the formation of a new customary international space law. Since the geopolitical tensions are intensifying, it is difficult to see dominant space nations such as the US, Russia, China and India agreeing on the complexities of space-related issues and definitions that concern the use of force, militarization or weaponization. Therefore, any kind of superficially "good-natured" legislative efforts, whether they are soft law or any other method, are probably rather few in their quantity and minimal in their effectiveness, if not non-existent (at least in the near future).

As has been discussed, the data provided and the academic literature support my claims, since among other things, I see that new, novel approaches are needed by the political actors, that we have to avoid entering a "fear-based" world and that the international regulatory framework is in serious need of updating. The OST and other space treaties remain outdated, ambiguous or filled with loopholes whether we consider the militarization/weaponization of outer space or international space legislation generally. Additionally, regarding the UN COPUOS and ITU as examples, the observations that the legal professionals seem to be directionless and standing on the sidelines, while the political professionals appear to be disinterested and busy, as was discussed earlier, is something that should be quite alarming for various professionals and laymen alike. Again, it is very difficult to see any kind of proactive legal development in such an environment. However, there have been no major

conflicts in space yet, as it seems that states follow international legislation for reputational concerns and thus comply with international law at the moment, in order to avoid incidents in the global commons areas such as outer space and celestial bodies. Activism, environmentalism, and scientists are mentioned somewhat as part of the whole in avoiding these conflicts, but I would still argue that public knowledge of space-related issues is still fairly trivial. At the same time, I also see that due to the Ukraine war the media has ramped up their efforts to follow operations in space (both civilian and military operations), which might serve to increase the general public's awareness of these issues.

Incomplete prohibitions in various parts of the international space law legislation also jeopardize the possibilities for legal recourse in cases of testing or use of space weapons in times of peace and conflict. In general, I am not suggesting that the solution to the problem is as simple as more regulation providing all or even some of the answers. However, addressing these gaps, conflicts and ambiguities appropriately could help avoid entering a similar period of fear that was at its height during the Cold War and avoid collateral damage from the use of debris-causing space weapons. Legal framework will also provide a basis for the countermeasures of the international community. In general, the issue is rather that the extent of nations' capabilities to militarize/weaponize space should be the subject of discussion and regulation rather than the complete demilitarization of space. Soft law such as PPWT and different codes of conduct have been offered as a partial way forward, but as I have demonstrated earlier, they still represent the disguised intentions and interests of individual states.

Concerning the first and the second research question, it is difficult to offer critical and opposing views to them, since it is challenging to find academic arguments providing insight into how the international legislation has succeeded in regulating these matters or how the militarization or weaponization of space is not going to proceed. Regarding the justifications for the militarization/weaponization of space, the doctrines of sovereignty and (collective) self-defence could be seen as possible justifications, however it could also be seen to lead to even further rearmament, producing an endless cycle as has been discussed above. Uncertainty about the specific intentions of different space nations to develop and deploy space-related assets, such as satellites, causes further rearmament in space, as the states have to be prepared for the capabilities of other, potentially hostile, nations. Here it is important to keep in mind that often space related assets, which have defensive capabilities, are capable of conducting offensive operations as well, which again forces states to prepare for the

capabilities of other nations. All of this emphasizes the very importance of regulating these matters proactively during time of peace, but in contrast to this, when considering the current, tense geopolitical relations, we might be entering an era where space armament is becoming more and more unregulated, rapid, straightforward and even somewhat more generally openly performed, being motivated at the same time by the aforementioned distrust (not to forget the importance of the MCF, grey zone activities and private actors).

The Article II of the OST or state practice together with international customary law could allow the appropriation of territory on the celestial bodies in the future, as has been suggested in the related academic discussion. The current gaps, conflicts and ambiguities make it possible that this sort of a legal development would leave even more room for states' grey zone activities and the various possibilities that they create. Related to this are private companies and private actors, who play a key role in regard to the appropriation of the resources in outer space and celestial bodies. Although in narrow sense it is out of the scope of this thesis, it must be recognized that all the different parts of society work in a symbiosis and commercial interests are connected to military activities and political interests. Space resources include enormously valuable commodities and I argue that there may be no valid reason not to utilize these resources for the benefit of the development of humankind. However, as has been shown earlier, the commercial actors are in need of an international "rulebook", which indirectly can affect the space militarization and weaponization. I argue that the approach regarding appropriation could be heading towards allowing the so-called "soft occupation", where either directly state-related actors or commercial actors possibly together with clandestine state operators (grey zone activities) will occupy celestial body territory while not technically conducting openly acknowledged government-related military operations. Henceforth, I see that limiting or at least proactively regulating the (collective) self-defense measures and appropriation in space is also extremely important. Furthermore, I see that we may need to embrace the fact that the militarization and weaponization of space is indeed imminent and one could even argue that it is justified (for the sake of the development, or even survival, of humankind), but we must also be able to control it, at least on some scale, while providing a basis for countermeasures against the activities of rogue states and also a robust forum for the resolution of space-related disputes (this admittedly follows the approach of legal realism).

In the case of the third research question, as stated earlier, the current world powers continually increase their presence in outer space, which is not limited only to space weapons

or the militarization of space or even satellites, although they are also an integral part of a state's war effort. As pointed out in the previous chapters, among Western militaries, for example, those of Great Britain and the United States are highly dependent on space resources, which, while making space assets a means for multiplying their military power, also sets new vulnerabilities for the respective states capabilities which naturally need to be protected. In addition, the symbolic value must also be taken into account, especially when discussing the superpowers, namely the US and Russia (at least at the moment – the rising importance of space for particularly China and India should not be forgotten). Justesen's arguments and notions about the diorama model and heterarchy together with her empirical data from UN COPUOS show that the different professional suborders are rather divided and narrowly focused. This is mainly due to historical and cultural factors, as for example military has one assignment and it is supposed to do it as well as possible, without using resources to think about sustainable development or any other issue outside of its own field. The scientific community may be blinded by its purely academic efforts and ideals and becomes frustrated when the political division and actors encroach on these ideals with their state interests. And perhaps least surprisingly (at least for us legal professionals), lawyers (or at least some of them), are particularly narrowly focused on their only expertise and prefer to focus only on doing what they are told to do, versus being proactive and finding solutions through legal means and the symbiosis of different professions and expert knowledge. Therefore, one of the most troubling aspects of Justesen's empirical data and conclusions presented above is that there is no interaction or even drive for the much-needed interaction between different professional (academic, political, legal, military, commercial) suborders, although at the same time that very interaction could lead to an order in outer space that has the potential to be at least somewhat stable. In the absence of this cooperation between different groups, it can be seen that the political suborder should take responsibility. However, again as the observations that has been presented above (mainly in regard to Justesen's findings and empirical data) present, politicians are mainly concerned with matters here on Earth, and therefore, I argue that it is futile to expect any concrete results from the development of international space legislation, if this is the current *ethos* of international forums.

In the current geopolitical situation Russia and China, possibly together with states that are considered to be their close partners such as Iran and North Korea among others, clearly pursue to replace the hegemonic status of the United States in the world order, Putin even

publicly announcing that the future world order will be multipolar.[380] The Ukraine conflict may be the first step to a decade(s)-long era of a new, more diverse world order, which will reflect in the militarization and weaponization of outer space and celestial bodies. I argue that the possible theoretical success of the Garcia's global commons law is based on an assumption of more peaceful times between the West and the East. This thesis would look very different without the Ukraine war and the future of space legislation and international cooperation at least somewhat brighter, however minor that difference would be due to other geopolitical tensions. Therefore, I find that in the future we will probably have to rely on to the familiar concept of deterrence effect instead of practicing harmonized and controlled cooperation with nations, causing further rearmament between nations and escalating the already ongoing arms race to space 2.0. The deterrence effect became known in connection with nuclear weapons during the Cold War, referring to the deterrent effect that the possession of nuclear weapons by the East and the West had on the use of these weapons. The fear of a massive retaliatory strike by the enemy of the state performing the "preventive" or first strike kept the nuclear warheads grounded. Although it has its critics, the deterrence effect has persisted through the decades of the Cold War and the time after, the war in Ukraine being the latest and still ongoing test of it. I argue that this principle of deterrence effect will not prevent the imminent arms race to space 2.0 and the militarization of outer space and celestial bodies, but it may for the time being prevent the use of space weapons in a way that would cause massive destruction comparable to the use of WMDs. That is up to the point of the actual use of a space related WMD or nuclear weapon, even a smaller tactical nuclear warhead, because after such an event and its consequences the deterrence effect will have run its course. This might seem a rather theoretical course of events, but with the recent rhetoric from the leader of Russia with regard to the war in Ukraine, including the veiled threat to use nuclear weapons, all of a sudden it does not sound as far-fetched at all anymore. What makes it even more concerning, as was discussed in the previous chapters, even the legal professionals in the UN COPUOS are expecting the first space-related incident to happen, hoping it will be appropriate in scale, so that the international community is finally forced to direct its focus on outer space legislation.

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[380] Homepage of the NBC News https://www.nbcnews.com/news/world/china-russia-xi-jinping-vladimir-putin-new-global-order-us-ukraine-rcna76268.

It has to be pointed out that all this does not mean that the behind the scenes work of Justesen's various "suborders" would not continue and that it would not have a significant effect in the era after the current geopolitical tensions have dissolved or that they would not continue to have some sort of an effect even during these unstable times. Rather, the role of different suborders tends to fluctuate with the times, producing a dynamic, ever-changing framework, that is dependable on the political will and mindset of the states and the geopolitical situation. During these times of heightened tensions, I argue that keeping dialogue channels open and maintaining connections between East and West is still important, even more important than during peacetime. Yet again, we are facing the problem that the uncertainty of the geopolitical field creates security dilemmas, which leads to fear and escalating rearmament and other measures. I have made many references to the importance of avoiding the road of escalation in my thesis, but this is something that also regularly comes up in the related scientific literature and hence cannot be too much emphasized. I mentioned earlier political attempts such as the UK's Open Ended Working Group, which, alas, great space nations such as China and Russia opposed and are not a part of. Therefore, I do agree with both Denise Garcia and Julia Balm that cooperation and transparency would be of the utmost importance with regard to maintaining space security, at least during more stable, peaceful times. I would only add that there should also be undisputed transparency and clarity in the interpretation of future space treaties, possible amendments or soft law since that would be the only way to prevent the already often mentioned intentional gaps, conflicts and ambiguities. At the moment though, we mainly have rather worrying examples of failed treaties based on transparency, such as the so-called Open skies treaty, from which the United States withdrew in 2020 and Russia closely followed suit in 2021. Additionally, the often-mentioned interest of states to weaken their adversaries still plagues these kinds of legislative efforts.

Ultimately, the importance of greater international cooperation cannot be overemphasized, even in times of mistrust and heightened tensions, since it is of an utmost significance and forms the very foundation upon which everything else is built in terms of current and future space security. Up until now the international cooperation in space research has highlighted the collaboration of states in space related matters and it has had a highly significant role in bringing various nations together. However, the Ukraine conflict has driven a wedge even deeper between the states conducting space research, and the halting of cooperation regarding Galileo-satellite in 2007 can already be seen as the first part of the puzzle of increasing

tensions related to space research and geopolitics. The current geopolitical power distribution, the war in Ukraine and the UN's inefficiency and dysfunctionality ensure that currently tensions remain high between Russia/China and the West (generally speaking) and the possibility of finding a consensus on the regulation and possible restriction of space weapons is almost non-existent. Underneath all of this lies the intentionality of the various gaps, conflicts and ambiguities in international space legislation and additionally the fragmentation and dysfunctionality of the different professional suborders. Therefore, I see that there is no simple solution to the new era of accelerating space race and the growing threat of militarization/weaponization of space, but rather that this solution is multifaceted: improved international legislation, the political will of states and organizations, the symbiosis of different professions and expert knowledge working together and the deterrent effect all could form a certain kind of structure to ensure at least some decree of order in space that also provides, at the very least, an imperfect legislative framework and means to avoid a similar period of fear and terror to what humanity experienced during the Cold War. It is then our duty as members of different professional communities to work together in order to prevent the re-emergence of the era of horror and to maintain and continue the efforts and discussion towards the controlled conquest of outer space by mankind.