

7-30-2019

Revisiting U.S – China Aggressive Use of Outer Space: A Comprehensive International Law Outlook Towards Military Activities in Outer Space

Alif Nurfakhri Muhammad

Faculty of Law, Universitas Indonesia, Indonesia, alif.nurfakhri@ui.ac.id

Follow this and additional works at: <https://scholarhub.ui.ac.id/ijil>

Recommended Citation

Muhammad, Alif Nurfakhri (2019) "Revisiting U.S – China Aggressive Use of Outer Space: A Comprehensive International Law Outlook Towards Military Activities in Outer Space," *Indonesian Journal of International Law*: Vol. 16 : No. 4 , Article 3.

DOI: 10.17304/ijil.vol16.4.761

Available at: <https://scholarhub.ui.ac.id/ijil/vol16/iss4/3>

This Article is brought to you for free and open access by UI Scholars Hub. It has been accepted for inclusion in Indonesian Journal of International Law by an authorized editor of UI Scholars Hub.

REVISITING U.S – CHINA AGGRESSIVE USE OF OUTER SPACE: A COMPREHENSIVE INTERNATIONAL LAW OUTLOOK TOWARDS MILITARY ACTIVITIES IN OUTER SPACE

Alif Nurfakhri Muhammad*

* Faculty of Law, Universitas Indonesia
Correspondence: alif.nurfakhri@ui.ac.id

Abstract

Outer Space, as the area on which freedom of use is guaranteed by the Treaty, creates a condition in which nations conduct their military activities. These activities however, were only limited to those conducted using nuclear weapons and/or containing nuclear materials. The principle of Peaceful Uses of Outer Space has been proven inadequate to regulate these activities. This has resulted to launches of weapons to Outer Space to destroy satellites, as conducted by the United States and China. These launches, whatever the purposes are, may cause hazardous repercussion to other State's activity in Outer Space. This article will comprehensively elaborate on related International Law and other measures which regulate military activities in Outer Space, especially on the launch of non-nuclear weaponry under any purposes. From these analyses, we can conclude that however inadequate the Outer Space Treaty article's stipulation in the matter, there are other stipulations of international law that we can gather that regulates military activity in Outer Space.

Keywords: *military activities, outer space, peaceful purposes, self-defense.*

Submitted : 23 March 2019 | Revised : 8 May 2019 | Accepted : 5 July 2019

I. INTRODUCTION

Nowadays, the Outer Space is becoming more accessible to any State. Its utilization has become a backbone to human life. From communication to navigation, human activities, inevitably, has become more and more dependent upon space assets. This too applies to various military of States, for it has already been known that at first, the development of space technology was pioneered by military advancements.¹ These advancements, according to militarist were and still are required to achieve a “higher ground”, which in this case, in Outer Space.² Efforts on regulating military space activities has been

¹ James Clay Moltz, *Crowded Orbits: Conflict and Cooperation in Space*, (New York: Columbia University Press, 2014), p. 121.

² Francis Lyall and Paul B. Larsen, *Space Law: A Treatise*, First Edition (New York: Routledge, 2009), p. 499.

going from the beginning, as, in the words of Manfred Lachs, due to the hazardous level of conducting activities in Outer Space, it must be only accessible to activities conducted for peaceful purposes only.³ Military activities in Outer Space, has also guaranteed its freedom of use under the Outer Space Treaty, which stipulates that:⁴

“Outer space, including the Moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies.”

There shall be freedom of scientific investigation in outer space, including the Moon and other celestial bodies, and States shall facilitate and encourage international cooperation in such investigation.”

Through such elaborations, we can clearly see that military activities, can be conducted in Outer Space. There are several problems that arises from the freedom of use of Outer Space, particularly by the military of States. Firstly, to what extent that a State may exercise these freedoms militarily. Secondly, are there any regulations, protecting other State interests or any regulations regulating any military conduct in Outer Space. We can start dissecting these two problems by exploring generally, on the “rules of conduct” of the activities of States in Outer Space, in relation to military activities.

II. MILITARY ACTIVITY UNDER INTERNATIONAL SPACE TREATIES

A. OUTER SPACE TREATY 1967

The Outer Space Treaty of 1967, have stipulations that may be applied in the matter of military activities in Outer Space. Those stipulations are:

1. The Use of Outer Space for Peaceful Purposes

³ Manfred Lachs, *The Law of Outer Space, An Experience in Contemporary Law Making*, (Leiden: Martinus Nijhoff Publishers, 2010), p. 97.

⁴ United Nations, *Treaty on Principles Governing the Activity of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, Art. I paragraphs 2-3.

The rule of *peaceful purposes* was stated in Article IV which stipulated that:⁵

“State Parties to the Treaty undertake not to place in orbit around the earth any object carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapon on celestial bodies, or station such weapon in outer space in any other manner.

The moon and other celestial bodies shall be used by all State Parties to the Treaty exclusively for peaceful purposes. The establishment of military bases, installations and fortifications, the testing of any types of weapons and the conduct of military maneuvers on celestial bodies shall be forbidden. The use of military personnel for scientific research or for any other peaceful purposes shall not be prohibited. The use of any equipment or facility necessary for peaceful exploration of the moon and other celestial bodies shall also not be prohibited.”

The rules on Article IV, reflects the intention of the treaty makers to keep the Outer Space out of the reach of the military of States. This is a safeguard that keeps Outer Space away from a global arms race. At the beginning, the common understanding of *peaceful purposes* rule under the Outer Space Treaty is that Outer Space, must be free from any military activities.⁶ This understanding came from other treaty that forms the basis of *peaceful purposes*, the Antarctic Treaty of 1959, which stipulated that *peaceful purposes* means prohibiting the entire spectrum of military activities.⁷

A question may arise on why does the Antarctic Treaty relevant in explaining the *peaceful purposes* stipulation under the Outer Space Treaty, considering that both, territorially, a different regime. In the early days of creating an Outer Space Law, it was understood that to fill a legal vacuum overshadowing the meaning of *peaceful purposes*,

⁵ United Nations, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, Art. IV.

⁶ Fabio Tronchetti, “Legal Aspects of the Military Uses of Outer Space” in Frans G. von Der Dunk and Fabio Tronchetti, eds., *Handbook of Space Law*, (Cheltenham: Edward Elgar Publishing Limited, 2015), p. 339.

⁷ *Ibid.*

the “Antarctic Analogy” may be used.⁸ This use of analogy is supported by various experts, including but not limited to, Jessup and Taubenfeld, whom have used the Antarctic analogy, as a basis to shape the meaning of *peaceful purposes* in international law generally and Outer Space Law specifically, on a basis that practices conducted in Antarctica is closely related to Outer Space, territorially.⁹ This expert analogy is based on the approach that both Antarctica and Outer Space can be categorized as *res communis*¹⁰, or a common area that does not belong to any State’s jurisdiction.¹¹ It has also been shown that in one of the early United Nations General Assembly Resolutions, Outer Space was considered as an area of a *common heritage of mankind*, and this is also why that activities in Outer Space must be conducted for *peaceful purposes* only, under the understanding of *peaceful purposes* mentioned above.¹² The “demilitarizing” approach of defining *peaceful purposes* by the Antarctic Treaty was more focused on the issue of armaments, and it is also another reason why it was used as an analogy to explain what does *peaceful purposes* means.¹³

This definition of *peaceful purposes* however, is not well accepted in state practice. United States as one of the State Party to the Outer Space Treaty was, and always is, in its practice on Outer Space, define *peaceful purposes* as not conducting military activity that is aggressive in nature.¹⁴ The Aggressive nature in military activities on Outer Space should be restricted, not prohibited. This is currently shown in the

⁸ Philip de Man, *Exclusive use in an Inclusive Environment: The Meaning of the Non-Appropriation Principle for Space Resource Exploitation*, (Switzerland: Springer International Publishing, 2016), p. 13.

⁹ *Ibid.*, p. 14.

¹⁰ M.J. Peterson, *International Regimes for the Final Frontier*, (New York: State University of New York Press, 2005), p. 49.

¹¹ Detlev Wolter, *Common Security in Outer Space and International Law*, (Geneva: UNIDIR, 2006), p. 90.

¹² Manfred Lachs, *The Law of Outer Space, An Experience in Contemporary Law Making*, (Leiden: Martinus Nijhoff Publishers, 2010), p. 97.

¹³ Kuan Wei-Chen, “The Legality on the Use of Space Weapons: Perspectives from Environmental Law”, (Thesis McGill University, Montreal, 2012), p. 33.

¹⁴ Martin Menter, “Peaceful Uses of Outer Space and National Security”, *The International Lawyer*, 17:3 (Summer 1983), p. 584.

United States' National Space Policy which states:¹⁵

“Under National Space Policy, Peaceful Purposes allow defense and intelligence-related activities in pursuit of national security and other goals. Permitted is the use of offensive space forces, either in a counter space or space-to-ground role, in a national or collective self-defense under Article 51 of the United Nations Charter or when the use of force is authorized by the United Nations Security Council.”

Based on the mentioned statement in the U.S. National Space Policy we can conclude that in principle, United States consider *peaceful purposes* in the meaning of a restrictive “non-aggressive” nature of its military activity in Outer Space. This consideration and understanding has also been implied in various U.S. space law experts, such as Edward Finch. He argues that the stipulation under Article IV of the Outer Space Treaty already suggested that “non-military” approach is not possible, since the article has stipulated that military personnel are authorized “for scientific research or for any other peaceful purposes”.¹⁶ In practice, most States also consider that the meaning of *peaceful purposes* stipulation under Article IV of the Outer Space Treaty towards military activity is that it should be able to be conducted, but not aggressively.¹⁷ Other experts have suggested that Article IV must only used in order to protect space from aggressive military activity, partially.¹⁸ Tronchetti suggested that this “partial demilitarization” understanding emerges, because Article IV only clearly stipulated that weapons that should not be discharged in Outer Space are nuclear weapons or weapons of mass destruction.¹⁹

¹⁵ Michael N. Schmitt, “International Law and Military Operations in Outer Space”, in A. von Bogdandy and R. Wolfrum, eds., *Max Planck Yearbook of United Nations Law*, (Netherlands: Koninklijke Brill N.V., 2006), p. 101.

¹⁶ Edward Finch, “Outer Space for “Peaceful Purposes”, *American Bar Association Journal*, 54:4 (April 1968), p. 366.

¹⁷ Michael N. Schmitt, “International Law and Military Operations in Outer Space”, in A. von Bogdandy and R. Wolfrum, eds., *Max Planck Yearbook of United Nations Law*, (Netherlands: Koninklijke Brill N.V., 2006), p. 101.

¹⁸ Fabio Tronchetti, “Legal Aspects of the Military Uses of Outer Space” in Frans G. von Der Dunk and Fabio Tronchetti, eds., *Handbook of Space Law*, (Cheltenham: Edward Elgar Publishing Limited, 2015), p. 333.

¹⁹ Fabio Tronchetti, *Fundamentals of Space Law and Policy*, (New York: Springer, 2013), p. 9.

2. Conducting Activities that Caused Harmful Contamination

Besides the *peaceful purposes* stipulation, other stipulation under the Outer Space Treaty that may be related to our exposition is the stipulation under Article IX, which stated that:²⁰

“In the exploration and use of outer space, including the Moon and other celestial bodies, States Parties to the Treaty shall be guided by the principle of cooperation and mutual assistance and shall conduct all their activities in outer space, including the Moon and other celestial bodies, with due regard to the corresponding interests of all other States Parties to the Treaty. States Parties to the Treaty shall pursue studies of outer space, including the Moon and other celestial bodies, and conduct exploration of them so as to avoid their harmful contamination and also adverse changes in the environment of the Earth resulting from the introduction of extraterrestrial matter and, where necessary, shall adopt appropriate measures for this purpose. If a State Party to the Treaty has reason to believe that an activity or experiment planned by it or its nationals in outer space, including the Moon and other celestial bodies, would cause potentially harmful interference with activities of other States Parties in the peaceful exploration and use of outer space, including the Moon and other celestial bodies, it shall undertake appropriate international consultations before proceeding with any such activity or experiment.

A State Party to the Treaty which has reason to believe that an activity or experiment planned by another State Party in outer space, including the Moon and other celestial bodies, would cause potentially harmful interference with activities in the peaceful exploration and use of outer space, including the Moon and other celestial bodies, may request consultation concerning the activity or experiment.”

The stipulation under Article IX, suggested that activities of other States in Outer Space, shall not cause any harmful contamination.²¹ However, this article does not clearly state on what is *harmful contamination*, and it does not provide a clear standard or regulation on how harmful contamination must be acted upon, or any sanctions for

²⁰ United Nations, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, Art. IX.

²¹ Promit Chatterjee, “Legality of Anti-Satellites Under Space Law Regime”, *Astropolitics*, 12:1 (2014), p. 39.

States that is responsible in causing such contamination.²²

To understand the concept of harmful contamination or harmful interference, one must discern several kinds of harmful contamination. Firstly, there is *physical contamination or interference*, and secondly, there is *non-physical contamination or interference*.²³ Physical contamination or interference may be caused by the use of projectile weapons in Outer Space, such as a conventional missile or a directed energy weapon, even a satellite which has its own orbit to impact other space objects.²⁴ Non-physical contamination or interference is contamination or interference that is caused by non-physical activities, such as jamming, hacking, or spoofing that resulted in a non-physical, non-permanent damage to space objects.²⁵ Those understanding were also supported by various experts. Kolossov argued that harmful contamination or interference is caused by a more physical contamination or interference in nature, that will contaminate Outer Space with debris, and may interfere with other State's activities in Outer Space.²⁶ While Schmitt argued that contamination or interference are not only those which are in nature physical, but also includes interference in imaging, remote sensing or surveillance via satellite by "blinding" it.²⁷

To explain further about harmful contamination, one must perceive beyond the perspective of existing international space law stipulations by exploring it from another perspective instead, such as international treaties or other international law sources.

III. MILITARY ACTIVITY UNDER OTHER INTERNATIONAL TREATIES

After exploring the stipulations under the Outer Space Treaty which is closely related to military activity in Outer Space, we are now going

²² *Ibid.*

²³ Samuel Black, "No Harmful Interference with Space Objects: The Key to Confidence Building", *Stimson Center Report*, 69 (2008), p. 5.

²⁴ *Ibid.*

²⁵ *Ibid.*, p. 6.

²⁶ Kuan Wei-Chen, "The Legality on the Use of Space Weapons: Perspectives from Environmental Law", (Thesis McGill University, Montreal, 2012), p. 49.

²⁷ Michael N. Schmitt, "International Law and Military Operations in Outer Space", in A. von Bogdandy and R. Wolfrum, eds., *Max Planck Yearbook of United Nations Law*, (Netherlands: Koninklijke Brill N.V., 2006), p. 105.

to explore other stipulations under other international law sources, specifically treaties, to comprehensively “catalogue” articles stipulating military activities.

1. The United Nations Charter

The United Nations Charter is widely known as the primary source of international law that encompasses many activities. One of which, is military activity. The United Nations Charter does not directly stipulate military activity in outer space, but there are some military activities that is stipulated under The Charter.

First stipulation regulates the issue of *threat or use of force*. The United Nations Charter stipulated this issue under Article 2 Paragraph (4), which says that:²⁸

“All members shall refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any state, or in any other manner inconsistent with the Purposes of the United Nations.”

The article regulates that every nation must refrain from threat or use of force.²⁹ However, threat or use of force may be justified under the pretense of *self-defense*.³⁰ Self-defense itself is an inherent right of all states to defend itself from any attack or aggression from other states.³¹ This inherent right is protected under Article 51 of The Charter, which stipulated that:³²

“Nothing in this present Charter shall impair the inherent right of self-defense if an armed attack occurs against a Member of the United Nations, until the Security Council has taken the measures necessary to maintain international peace and security. Measures taken by members in the exercise of this right of self-defense shall be immediately reported to the Security Council and shall not in any way affect the authority and responsibility of the Security Council under the present Charter to take at

²⁸ United Nations, *Charter of the United Nations and the Statute of the International Court of Justice*, Art. 2 para 4.

²⁹ Robert L. Bridge, “International Law and Military Activities in Outer Space”, *Akron Law Review*, 13:4 (1980), p. 659.

³⁰ *Ibid.*

³¹ Robert W. Jarman, “The Law of Neutrality in Outer Space”, (Thesis McGill University, 2008), p. 45.

³² United Nations, *Charter of the United Nations and the Statute of the International Court of Justice*, Art. 51.

any time such action as it deems necessary in order to maintain or restore international peace and security.”

In regards to the matter of military measures or activity as an exercise of self-defense, there are several kinds of self-defense that needed to be explained. The first is *anticipatory self-defense*, an act of self-defense by the state which is caused when a state believes that there is a present and imminent threat, even if an attack was not present.³³ In military activity on Outer Space, this kind of self-defense can be seen in surveillance and/or reconnaissance activities, mainly to activities that is not hostile or aggressive in nature.³⁴ In short, anticipatory self-defense is the kind of self-defense that responds to the presence of threat, not as retaliation to use of force.³⁵

The other type of self-defense is *preemptive self-defense*. This type of self-defense is a unilateral decision of any state that act as a precaution to supposed threat which is not imminent.³⁶ This type of self-defense is the most dangerous of all since it does not need any consent of international authority, or any events that may make a state consider that there is a threat to them and makes it a dangerous type of self-defense.³⁷ In the context of military activity in Outer Space, this type of self-defense is closely related to the development and testing of conventional space weapons, such as anti-satellite weaponry. Both of these types of self-defense must be conducted in the principles of proportionality and necessity.³⁸

³³ Francis Lyall and Paul B. Larsen, *Space Law: A Treatise*, First Edition (New York: Routledge, 2009), p. 504.

³⁴ *Ibid.*

³⁵ James A. Green and Francis Grimal, “The Threat of Force as an Action in Self-Defense Under International Law”, *Vanderbilt Journal of Transnational Law*, 44:285 (2011), p. 303.

³⁶ Patrick Kelly, “Preemptive Self-Defense, Customary International Law, and the Congolese Wars”, *E-International Relations Student*, www.e-ir.info/2016/09/03/pre-emptive-self-defense-customary-international-law-and-the-congolese-wars/, (2016), accessed on 25 December 2017.

³⁷ Francis Lyall and Paul B. Larsen, *Space Law: A Treatise*, First Edition (New York: Routledge, 2009), p. 505.

³⁸ Paul A. Dawson, “The Legality of Self-Defense Regarding Dual-Use Space Objects”, (Thesis McGill University, 2014), p. 25.

2. Convention on the Military and Other Hostile Use of Environmental Modification Technique

Another international convention as a source to look at regulations on military activity is the Convention on the Military and Other Hostile Use of Environmental Modification Techniques. This present convention under Article 1 stipulated that it prohibits any nations to do military activities that may cause change and/or modification to the environment or manipulate natural condition of a territory, including the Outer Space.³⁹ In the context of aggressive military activity in Outer Space, this convention prohibits the change of natural conditions of Outer Space, especially when a state uses its anti-satellite weaponry to shoot down satellites, even if it is its own satellite, because it may cause debris that may alter the natural condition of space.⁴⁰

3. Military Activities Regulated under Disarmament Related Treaties

Lastly, we must see regulations related to disarmament and arms limitation that may shed some light on military activity. First off, there is the *Limited Test Ban Treaty*. This treaty prohibits nuclear weapon testing, including the Outer Space, before the presence of the Outer Space Treaty.⁴¹ This Treaty was made in the midst of the *Operation Starfish Prime*, in which the United States tested nuclear missiles at the *High Earth Orbit*.⁴² Another treaty in relations of this treaty is the *Comprehensive Test Ban Treaty*, but these two treaties only regulate the prohibition of nuclear weapon tests in Outer Space, as is stipulated under the Outer Space Treaty.⁴³

³⁹ Eligar Sadeh, "International Space Governance: Challenges for the Global Space Community", in R. Venkata Rao, *et al.*, eds., *Recent Developments in Space Law, Opportunities, and Challenges*, (Singapore: Springer Nature Singapore Pte Ltd, 2017), p. 52.

⁴⁰ Fabio Tronchetti, "Legal Aspects of the Military Uses of Outer Space" in Frans G. von Der Dunk and Fabio Tronchetti, eds., *Handbook of Space Law*, (Cheltenham: Edward Elgar Publishing Limited, 2015), p. 345.

⁴¹ Karl D. Herbert, "Regulations of Space Weapons: Ensuring Stability and Continued Use of Outer Space", *Astropolitics*, 12:1 (2014), p. 4.

⁴² *Ibid.*

⁴³ Fabio Tronchetti, "Legal Aspects of the Military Uses of Outer Space" in Frans G. von Der Dunk and Fabio Tronchetti, eds., *Handbook of Space Law*, (Cheltenham: Edward Elgar Publishing Limited, 2015), p. 344.

Second treaty worth mentioning is the *Anti-Ballistic Missile Treaty* or the ABM Treaty. This treaty was a bilateral effort between the United States and the Soviet Union during the Cold War which intention is to end the making and testing of anti-ballistic missiles.⁴⁴ This treaty is closely related to aggressive activity of military in Outer Space as anti-satellite weaponry is mostly developed from an anti-ballistic missile. This treaty prevents arms race in Outer Space for decades, before the United States had decided to withdraw itself from the treaty in 2001.⁴⁵ Even though this treaty is currently terminated, it had already set a basis of military activities in Outer Space.

IV. STATE PRACTICES

After exploring the possible regulations for military activity in Outer Space, we are now going to examine States activities, especially its military, in Outer Space. We are going to focus our discussion, to those conducted by the United States and China.

A. UNITED STATES PRACTICES

The United States is the foremost actor in the utilization of Outer Space for its military. This happens because the United States considered that Outer Space has a distinct advantage that might be useful during conflicts and peacetime, such as unlimited access to survey every region on Earth, and advantages of coverage, since military assets placed in Outer Space can cover a wider area than those placed on the Surface of the Earth.⁴⁶ The United States considered that it is important to have military measures to deter and prevent threat, in a form of self-defense, by having space weaponry.⁴⁷ This attitude can be seen from the U.S. Space Acquisition Policy of 2004 in which the United States, stated that it must have some kind of a weapon system which status is

⁴⁴ Wulf Von Kries, "The Demise of the ABM Treaty and the Militarization of Outer Space", *Space Policy*, 18 (2002), p. 175.

⁴⁵ *Ibid.* p. 176.

⁴⁶ Michael N. Schmitt, "International Law and Military Operations in Outer Space", in A. von Bogdandy and R. Wolfrum, eds., *Max Planck Yearbook of United Nations Law*, (Netherlands: Koninklijke Brill N.V., 2006), p. 94.

⁴⁷ Vishnu Anantamula, "U.S. Initiative to Place Weapons in Space: The Catalyst for a Space-Based Arms Race with China and Russia", *Astropolitics*, 11:3 (2013), p. 136.

blurred between a mean of deterrence and a form of self-defense, that will hamper and slow any threat of force from its enemies and perform as a balance of threat by the United States for its potential enemies.⁴⁸ To conduct military activities in Space, the United States has a “Joint Military Doctrine”, in which the United States divide military activities in Outer Space into four mission categories:⁴⁹

- 1) *Space Control*, in which the United States viewed Outer Space Assets as a mean to support its military activity on Earth for combat support, and combat service support operation which ensure freedom of use to Outer Space for United States and Its Allies.
- 2) *Space Force Enhancement*, in which the United States aim to enhance its military operational capabilities on ground, sea and air by augmenting the capability of intelligence, surveillance, and reconnaissance (ISR), integrated tactical warning and attack assessment, environmental monitoring, communications, and navigation to achieve combat effectiveness.
- 3) *Space Force Application*, in which the United States aim to place conventional weapon in Outer Space targeting other military installations in ground and at sea.
- 4) *Space Support*, in which the United States must have supportive system to its Outer Space activities.

These mission categories were placed to ensure United States military capability in Space. Apart from a military doctrine, the United States has a National Space Policy, as a basis for its activities in Outer Space in general, and its military activities in Outer Space specifically. This National Space Policy was created to ensure the sustainable use of Outer Space and only for peaceful purposes.⁵⁰ In this National Space Policy, it is also shown that the United States has aimed to increase its

⁴⁸ *Ibid.*, p. 137.

⁴⁹ Michael N. Schmitt, “International Law and Military Operations in Outer Space”, in A. von Bogdandy and R. Wolfrum, eds., *Max Planck Yearbook of United Nations Law*, (Netherlands: Koninklijke Brill N.V., 2006), p. 95-97.

⁵⁰ Peter L. Hays, *Space and Security: A Reference Handbook*, (California: ABC-CLIO LLC, 2011), p. 202.

defense capabilities in space by any means necessary.⁵¹ National Space Policy Stated that:⁵²

“The United States considers space capabilities—including the ground and space segments and supporting links—vital to its national interests. Consistent with this policy, the United States will: preserve its rights, capabilities, and freedom of action in space; dissuade or deter others from either impeding those rights or developing capabilities intended to do so; take those actions necessary to protect its space capabilities; respond to interference; and deny, if necessary, adversaries the use of space capabilities hostile to U.S. national interests.”

Next, we have to see what capabilities does the United States have to conduct its military activity in Outer Space. This section will be divided into two parts. The non-aggressive activity and the aggressive activity. First, the non-aggressive activities. The United States military is very dependent of its space assets to support military activities on Earth. As one of its largest operator, the U.S. Navy uses 95% of the U.S. Military space assets to support their naval operations, specifically to support communication.⁵³ There are several ways the United States conduct its non-aggressive military activities in Outer Space, these activities are:

1. Communication

The United States Military operate a series of military communication satellites. Most prominent of it all is the MILSTAR or Military Strategic and Tactical Relay, which consists of 5 different satellites joined in a network system placed on Geostationary Orbit (GSO).⁵⁴ It gives the U.S. Military an advantage of communication security.⁵⁵ This type of

⁵¹ U.S. Joint Chiefs of Staffs, *Joint Publication on Space Operation*, (s.l.: s.n., 2013), p. II-8.

⁵² Robert David Onley, “Death from Above – The Weaponization of Space and the Threat to International Humanitarian Law”, *Journal of Air Law and Commerce*, 78 (2013), p. 753.

⁵³ Roger C. Hunter, *A U.S. ASAT Policy for a Multipolar World*, (Thesis School of Advanced Airpower Studies, 1992), p. 7.

⁵⁴ Ricky J. Lee and Sarah L. Steele, “Military Use of Satellite Communications, Remote Sensing, a Global Positioning System in the War on Terror”, *Journal of Air Law and Commerce*, 79 (2014), p. 76.

⁵⁵ *Ibid.*

communication satellites are being used by the U.S. Air Force.⁵⁶ Another types of military communication satellites are the UHF Follow-On and Mobile User Objective System (MUOS) which are used by the U.S. Navy, and Defense Satellite Communication System which is used by the U.S. Army.⁵⁷

2. Remote Sensing and Surveillance⁵⁸

The United States Military is also employing a series of remote sensing and surveillance satellite to gather intelligence. This intelligence gathering operation is mostly conducted by the National Reconnaissance Office which gathered Earth Surface Images, spectrum sensing on Earth Surface, radar imagery, and signal interceptor that detects and record communication signals.

3. Navigation⁵⁹

This is one of the most important usage or activity in Outer Space by the United States Military. They employ a series of Global Positioning System (GPS) satellites. These satellites calculate latitude and longitude by request to pinpoint location. In the early development, the United States Military created this GPS system to be used exclusively for military. However, in 1987, United States Military allowed the usage of these GPS satellites for civilian use.⁶⁰ Currently the United States Military employs a series of 25 NAVSTAR (Navigation Satellite Time and Ranging) Satellites.

Besides some non-aggressive military activity in Outer Space, the United States has a long history of aggressive activities in Outer Space. It is considered by the United States military, that it is part of the space control and space force enhancement strategy. This activity is being conducted by developing what we call an *anti-satellite* weapon. Examples of these activities are:

⁵⁶ *Ibid.*

⁵⁷ *Ibid.*

⁵⁸ *Ibid.*, pp. 81-83.

⁵⁹ *Ibid.*, p. 84.

⁶⁰ Scott Page, *et al.*, *The Global Positioning System: Assessing National Policies*, (Santa Monica: RAND, 1995), p. 247.

4. Kinetic Kill Weapon

Kinetic Kill Weapon is a kind of missile to destroy satellites through a missile system. Examples of this weapon is the ASM-135 missile which was developed since the 1980s.⁶¹ The missile was launched towards a satellite in 1985, when it was used to destroy an aging P78-1 Solwind satellite.⁶² It was launched from a F-15 Fighter Jet,⁶³ and caused a field of debris consist of more than 285 debris which stayed in Orbit until 2008.⁶⁴ Another example of usage of this kind of weapon is the usage of SM-3 missile during Operation Burnt Frost, which was launched from a U.S. Navy ship USS Lake Erie towards satellite USA 193 which has fuel leakage that is considered dangerous to the atmosphere.⁶⁵ This launched caused a field of debris totaling at least 174 debris that stayed in orbit for more than 18 months.⁶⁶

5. Directed Energy Weapon⁶⁷

This kind of weapon was created for the purpose of interceptor or disruptor of satellite functions. Examples of this type of weapon are ground and space-based laser, radio-frequency weapon, and mid infrared advanced chemical laser (MIRACL), which can shoot laser to a certain optical satellite and disrupt its function or cause an optical

⁶¹ Ross Liemer and Christopher Chyba, “A Verifiable Limited Test Ban for Anti-Satellite Weapon”, *The Washington Quarterly*, 33:3 (2010), p. 152.

⁶² *Ibid.*

⁶³ David A. Koplow, “ASAT-isfaction: Customary International Law and the Regulation of Anti-Satellite Weapons”, *Michigan Journal of International Law*, 30 (2009), p. 1209.

⁶⁴ Brian Weeden, “Through a Glass, darkly: Chinese, American and Russian Anti-Satellite Testing in Space”, *Secure World Foundation*, https://swfound.org/media/167224/through_a_glass_darkly_march2014.pdf, (2014), p. 26, accessed on 21 December 2017.

⁶⁵ Laura Grego, “The Anti-Satellite Capability of the Phased Adaptive Approach Missile Defense System”, *Federation of American Scientist Public Interest Report* (2011), p. 1.

⁶⁶ Brian Weeden, “Through a Glass, darkly: Chinese, American and Russian Anti-Satellite Testing in Space”, *Secure World Foundation*, https://swfound.org/media/167224/through_a_glass_darkly_march2014.pdf, (2014), p. 26, accessed on 21 December 2017.

⁶⁷ Theresa Hitchens, *et al.*, “U.S. Space Weapons”, *The Nonproliferation Review*, Vol. 13 No. 1 (2006), p. 38.

damage to imaging or remote sensing satellites.⁶⁸

B. THE PEOPLE'S REPUBLIC OF CHINA'S PRACTICES

Besides the United States, China also has its own military activity in Outer Space. China started developing its military capabilities for space activities in the 1950s starting from its nuclear program.⁶⁹ At the beginning, the technological development of Chinese military was only directed towards conventional strategies, but since 1986, it was focused on a more tactical purpose.⁷⁰ This is shown through China's State High Tech Development Plan, that put forward the use of Outer Space for military activities by dual-use technology.⁷¹ There are some push factors that makes China see the needs to develop further its military capabilities in Outer Space, such as the *Strategic Defense Initiatives* of the United States, a Cold War Era space policy, that views the need to strengthen various technologies to conduct military activity in Outer Space.⁷² Another push factor is to support economic growth, strengthen its national defense, and to increase its domestic capabilities.⁷³

The conduct of military activity in Outer Space in China side also are based on its defense strategy doctrine. China focused its military development on "information" warfare to seek and achieve and advantage of information or intelligence by increasing its C4ISR (Command, Control, Communications, Computer, Intelligence, Surveillance, and Reconnaissance).⁷⁴ Besides focusing its military

⁶⁸ Theresa Hitchens, "A Recent Shift in U.S. Military Strategy and Provocative Actions by China Threatens to Ignite a New Arms Race in Space. But Would Placing Weapons in Space be in Anyone's National Interest?", *Scientific American*, 298:3 (March 2008), p. 81.

⁶⁹ Wu Chunsi, "China's Outer Space Activities: Motivations, Goals, and Policy", *Strategic Analysis*, 32:4, (2008), p. 622.

⁷⁰ Eric Hagt, and Matthew Durnin, "Space, China's Tactical Frontier", *Journal of Strategic Studies*, 34: 5, (October 2011), p. 735.

⁷¹ *Ibid.*

⁷² Wu Chunsi, "China's Outer Space Activities: Motivations, Goals, and Policy", *Strategic Analysis*, 32:4, (2008), p. 623.

⁷³ *Ibid.*, p. 624.

⁷⁴ Anthony H. Cordesman, *Chinese Space Strategy and Development*, (s.l.: Center for Strategic and International Studies, 2016), p. 4.

on developing capabilities for information warfare, China also seeks to increase its capability in *active defense*, meaning that militarily China always conduct defensive measures and only responds upon provocation by other states.⁷⁵ With this doctrine, China must develop its offensive capabilities, as stated in its Defense White Paper, in pursuing active defense. China will continue to develop and augment its military capabilities to balance the military capabilities of other world powers, including to military capabilities in Outer Space.⁷⁶

China's military activity in Outer Space can also be divided into non-aggressive and aggressive categories. In its state practice, China combine its satellite use both for military activities and civilian use.⁷⁷ Formally, China never admitted that its satellites are being used for military activity, but its satellites, which is registered as civilian satellite, are mostly used for military intelligence gathering, and other uses.⁷⁸ Several examples of China's non-aggressive military activities in Outer Space are:

1. Remote Sensing, and Satellite Imagery

China's military conducted remote sensing, and imagery mission from its satellite as a part of reconnaissance effort. In the early development, China can only launch a one-time use recoverable imaging satellites⁷⁹ this type of satellite used a conventional film to capture orbital imagery, and re-enter the atmosphere and recoverable after landing.⁸⁰ However in 1999, in a joint effort, China and Brazil develop CBERS (China Brazil Earth Resources Satellite), that have dual function of military use and civilian use.⁸¹ Other satellite that was launched by China specifically for

⁷⁵ Anthony H. Cordesman, and Steven Colley, *Chinese Strategy and Military Modernization in 2015: A Comparative Analysis*, (Washington D.C.: Center for Strategic and International Studies, 2015), p. 113.

⁷⁶ *Ibid.*, pp. 113-114.

⁷⁷ Ajey Lele, "China's Posture in Space and Its Implication", *Strategic Analysis*, 32:4 (2008), p. 607.

⁷⁸ Eric Hagt, and Matthew Durnin, "Space, China's Tactical Frontier", *Journal of Strategic Studies*, 34: 5, (October 2011), p. 737.

⁷⁹ *Ibid.*

⁸⁰ *Ibid.*

⁸¹ *Ibid.*

military remote sensing mission is the Yaogan Satellite Series.⁸² This series of satellites are equipped with special sensors such as:⁸³

- 1) ELINT: Electro Intelligence Sensor, which can capture electronic emission from military assets on Earth.
- 2) SAR: Synthetic Aperture Radar, which can be used to coordinate intelligence gathering among ELINT equipped satellites.
- 3) EO: Electro Optical Imaging, which is used to enhance the accuracy of electronic intelligence data gathered by ELINT equipped satellites.

There are, at least 30 Yaogan Satellites Orbiting the Earth at any current time. Besides these Yaogan satellites, there are other satellites launched by China with dual function mission, such as the Gaofen satellites, and Tianhui satellites.⁸⁴

2. Navigation

Chinese military, in its navigational needs, use the BeiDou satellite series which also function in dual use, military and civilian.⁸⁵ Up until 2016, there are 21 BeiDou satellites which form a navigation system that is used mainly by China and other Asian countries.⁸⁶ One of these countries is Pakistan, which since 2013 started the legal process to enable the use of this navigation satellites for its military, and by 2014, started using it.⁸⁷

⁸² S. Chandrashekar, Soma Perumal, *China's Constellation of Yaogan Satellites & the Anti-Ship Ballistic Missile*, (Bangalore: National Institute of Advanced Studies, 2016), p. 5.

⁸³ *Ibid.*

⁸⁴ U.S. Department of Defense, *Annual Report to Congress: Military and Security Development Involving the People's Republic of China 2014*, (Washington D.C.: Office of the Secretary of Defense, 2014)., p. 65.

⁸⁵ Anthony H. Cordesman, *Chinese Space Strategy and Development*, (s.l.: Center for Strategic and International Studies, 2016), p. 16.

⁸⁶ Kevin Pollpeter, "Space, the New Domain: Space Operations and Chinese Military Reforms", *Journal of Strategic Studies*, 39:5 (2016), p. 716.

⁸⁷ Sabena Siddiqui, "Pakistan Benefits from China's Sat-Nav System", *China.org.cn*, http://www.china.org.cn/business/2017-05/23/content_40873203.htm, (23 Mei 2017). Accessed on 18 December 2017.

3. Communication

Lastly, other non-aggressive activity of China's military in Outer Space is for communication. In this domain, there are two prominent satellite series in the Chinese's Arsenal, Fenghuo and Shentong, which used solely for securing military communication.⁸⁸ The Fenghuo satellite series were designed to provide China's military with communication-on-the-move capability which eases sending and receiving communication materials, and in keeping China's military awareness on land, sea, and air.⁸⁹

Now, our examination comes to the aggressive activity of China's military in Outer Space. China developed this capability as a part of its counter space capability in order to achieve space superiority.⁹⁰ This means that China is trying to balance other existing space capabilities.⁹¹ These capabilities can be divided into several categories:⁹²

Kinetic capabilities, in which China build and use physical conventional weapon system that may cause physical damage, which is permanent in nature and may create debris in Outer Space.

Non-Kinetic capabilities, in which China may explore another way of aggressive use, such as *directed energy weapon*, *jammer*, or hacking the satellite system to temporarily disable it. This can be done without

⁸⁸ Rui C. Barbosa, "Long March 3B Launches with ChinaSat 2C", *nasaspaceflight.com*, <https://www.nasaspaceflight.com/2015/11/long-march-3b-lofts-chinasat-2c/>, (3 November 2015). Accessed on 18 December 2017.

⁸⁹ Sanjay Poduval, "China's Space and Counterspace Capabilities" in *Indian and American Perspectives on Technological Developments in the Maritime Domain and Their Strategic Implications in the Indian Ocean Region*, ed., Pradeep Kaushiva and Kamlesh K. Agnihotri (New Delhi: KW Publishers, 2013), p. 6 https://books.google.co.id/books?id=gk26DQAAQBAJ&pg=PT85&lpg=PT85&dq=Fenghuo+satellite&source=bl&ots=2ROEsokDRi&sig=Cxgl5nn4u4eBDays6WVMFL3L_0c&hl=en&sa=X&ved=0ahUKewio_9S3zpXYAhVKPo8KHxjrDJ04ChDoAQgzMAI#v=onepage&q=Fengyun&f=false, accessed on 18 December 2017.

⁹⁰ Kevin Pollpeter, "Space, the New Domain: Space Operations and Chinese Military Reforms", *Journal of Strategic Studies*, 39:5 (2016), p. 717.

⁹¹ Baohui Zhang, "The Security Dilemma in the U.S.-China Military Space Relationship: The Prospect for Arms Control", *Asian Survey*, 51: 2 (March/April 2011), p. 314.

⁹² Kevin Pollpeter, et al. *China Dream, Space Dream: China's Progress in Space Technologies and Implications for the United States*, (s.l.:U.S. Government Publishing Office, s.n.), p. 90.

damaging the satellite and by not giving it physical damages.

Based on those two categories, we can now list weapons that China has obtained and used as its aggressive aspect of military activity in Outer Space. These weapons are:

- 1) *Direct Ascent Missile*, which is a kinetic kill vehicle or kinetic weapon made from modifying ballistic missile interceptor.⁹³ This type of weapon is often used by China in “test” runs. Up until 2016, there are at least three documented events of this weapon usage.

In 2007, China conducted its first successful anti-satellite weapon testing, the DN-1 missile, which is a modification of ballistic interceptor KT-1 to destroy FY-1C satellite from the altitude of 800 km on a Polar Orbit.⁹⁴ The missile used for this mission used the mix of infrared and radar sensor data to track target satellite in Orbit.⁹⁵ The satellite had successfully destroyed and caused more than 35,000 trackable debris that created a field covered around its former orbit.⁹⁶ These debris may threaten other state’s activity in Outer Space, not to mention the International Space Station, who has to recourse its orbit in order to evade this debris field.⁹⁷ Finally in 2013, this debris field collided with a Russian satellite *BLITS Retroreflector*, that caused this satellite off-coursed and disabled.⁹⁸

In 2010, 2013, and 2014 China also conduct weapon launches similar to the event of 2007, but not causing any debris field on

⁹³ Anthony H. Cordesman, *Chinese Space Strategy and Development*, (s.l.: Center for Strategic and International Studies, 2016), p. 22.

⁹⁴ *Ibid.*

⁹⁵ *Ibid.*

⁹⁶ *Ibid.*

⁹⁷ Gene V. Milowicki, and Joan Johnson-Freese, “Strategic Choices: Examining the United States Military Response to the Chinese Anti-Satellite Test”, *Astropolitics*, 6: 1 (2008), p. 2.

⁹⁸ Leonard David, “Russian Satellite Hit by Debris from Chinese Anti-Satellite Test”, *Space.com*, <https://www.space.com/20138-russian-satellite-chinese-space-junk.html>, (8 March 2013), accessed on 18 December 2017.

orbit.⁹⁹ All three launches successfully intercept satellites at an altitude of 30,000 km.¹⁰⁰ the launches in 2013 and 2014 were officially admitted by China to conduct tests for an upgraded version of its anti-satellite weapon, the DN-2 and DN-3, upgraded from the DN-1.¹⁰¹

- 2) *Close Proximity Operation*, which conducted by China using other satellite that can align its orbit to another target satellite. China conducted this operation in 2010, by using the Shinjiang SJ-12 satellite that had successfully gathered with SJ-6F satellite, while at the same time using a jammer to put the SJ-6F off its original orbit.¹⁰²
- 3) *Laser weaponry*. China also has the capability to shoot laser, which it did, in 2006, to a United States reconnaissance satellite orbiting above China.¹⁰³ In this event, the type of laser weapon China use falls under the category of HEL or High Energy Laser that may damage optical instrument of the target satellite.¹⁰⁴

In addition to this physical anti-satellite weapon operation, China has also conducted non-kinetic, non-physical operation by hacking other satellite. This is directly targeted and acted upon United States satellites, several of which are:¹⁰⁵

On October 2007 and July 2008, China hacked into United States remote sensing satellite Landsat-7 causing loss of communication for 12 minutes, but failed to take over the satellite functions.

⁹⁹ Gene V. Milowicki, and Joan Johnson-Freese, “Strategic Choices: Examining the United States Military Response to the Chinese Anti-Satellite Test”, *Astropolitics*, 6: 1 (2008), p. 4.

¹⁰⁰ Anthony H. Cordesman, *Chinese Space Strategy and Development*, (s.l.: Center for Strategic and International Studies, 2016), p. 23.

¹⁰¹ Vaydeesh Mahajan, “Chinese Antisatellite Means: Critically and Vulnerability of Indian Satellites”, *CLAWS Journal*, (Summer 2016), p. 175.

¹⁰² Anthony H. Cordesman, *Chinese Space Strategy and Development*, (s.l.: Center for Strategic and International Studies, 2016), p. 25.

¹⁰³ *Ibid.*, p. 26.

¹⁰⁴ Sanjay Poduval, “China’s Military Space Capabilities”, *Maritime Affairs: Journal of the National Maritime Foundation of India*, 7: 2 (2011), p. 97.

¹⁰⁵ Anthony H. Cordesman, *Chinese Space Strategy and Development*, (s.l.: Center for Strategic and International Studies, 2016), p. 27.

On June and October 2008, China also hacked into a United States satellite, the Terra Earth Observation Satellite, causing loss of communication for 2 minutes on June, and nine minutes in October. At both attack, China managed to take over the satellite, but there were no measures done by the Chinese.

On September 2014, China did hack a NOAA weather satellite used for United States military operation. The attack resulted in the dysfunctionality of the satellite's imaging system for two days, and communication of disaster mitigation, flight safety and shipping security data disrupted.

V. ANALYSIS

Based on the above mentioned military activities by the United States and China, we can now analyze their conduct based on international law rules. First, the Outer Space Treaty. The treaty has made it clear that Outer Space must only be used for activities of peaceful purposes under Article IV.¹⁰⁶ It has been mentioned that various experts such as Jessup and Taubenfeld that suggested the meaning of *peaceful purposes* is not to conduct any military activities, be it as a support system or aggressive weapon testing.¹⁰⁷ If based on this interpretation of the treaty, then it can be concluded that what the United States and China were doing are unlawful. Of course, there are other experts, such as Tronchetti who suggested that under the pretext of *peaceful purposes*, military activity can be conducted in Outer Space as long as it is not aggressive in nature.¹⁰⁸ In this way, the treaty only *partial demilitarization*, and can be said that the United States and China's military activity in Outer Space are still under the stipulation of Outer Space Treaty.

Next, we have to look on the reason of these activities conducted.

¹⁰⁶ G.S. Sachdeva, "Select Tenets of Space Law as Jus Cogens" in *Recent Developments in Space Law*, eds. R. Venkata Rao, et al., (Singapura: Springer, 2017), p. 12.

¹⁰⁷ Philip de Man, *Exclusive Use in an Inclusive Environment: The Meaning of the Non-Appropriation Principle for Space Resource Exploitation*, (Switzerland: Springer International Publishing, 2016), p. 14.

¹⁰⁸ Fabio Tronchetti, "Legal Aspects of the Military Uses of Outer Space" in Frans G. von Der Dunk and Fabio Tronchetti, eds., *Handbook of Space Law*, (Cheltenham: Edward Elgar Publishing Limited, 2015), p. 333.

Based on the above-mentioned reasons, the United States and China, both develop anti-satellite weapons as a response to each countries' threat given by their technological development in military activities. This can be categorized under *self-defense* measures. The United Nations Charter under Article 2 Paragraph 4 stipulated that every country shall refrain from threat or use of force. Now, in general, it is prohibited by the UN Charter to use force against any other state. However, this stipulation may give some "loophole", because there are no clear measures in defining the "threat of force".¹⁰⁹

Threat of force may be categorized into three kinds. The first one, a clear threat from one country to the other in a form of request, or an ultimatum, which, if in the absence of compliance, may resulted in use of force.¹¹⁰ Second kind is a threat that conveyed to a country that is a member of a defense pact or an international organization.¹¹¹ Last one, and the most dangerous of all, is a *hidden threat* that is an intended result of a state's military exercise, even a simple weapon test or a maneuver.¹¹² This kind of threat that is posed by aggressive military activities in outer space. In the context of US and China's aggressive military activity in Outer Space, to form threat, is their intended goal, as shown in their respective military publication. In the United States side, on their *Joint Military Publication on Space Operation*, it is stated that, the United States conduct aggressive military activities in Outer Space, as a means of deterrence or to present a threat to protect its space assets against threat of attack.¹¹³ This threat is achieved by pursuing *space control* capabilities, particularly *offensive space control*.¹¹⁴ This strategy is also implied in the National Space Policy, which states that:¹¹⁵

¹⁰⁹ Nikolas Stürchler, *The Threat of Force in International Law*, (New York: Cambridge University Press, 2007), p. 2.

¹¹⁰ James A. Green and Francis Grimal, "The Threat of Force as an Action in Self-Defense Under International Law", *Vanderbilt Journal of Transnational Law*, 44:285 (2011), pp. 295-296.

¹¹¹ *Ibid.*, p. 296.

¹¹² *Ibid.*, pp. 296-297.

¹¹³ U.S. Joint Chiefs of Staffs, *Joint Publication on Space Operation*, (s.l.: s.n., 2013), p. I-2.

¹¹⁴ *Ibid.*, p. II-8.

¹¹⁵ Robert David Onley, "Death from Above – The Weaponization of Space and The Threat to International Humanitarian Law", *Journal of Air Law and Commerce*, Vol. 78 (2013), p. 753.

“The United States considers space capabilities-including the ground and space segments and supporting links-vital to its national interests. Consistent with this policy, the United States will: preserve its rights, capabilities, and freedom of action in space; dissuade or deter others from either impeding those rights or developing capabilities intended to do so; take those actions necessary to protect its space capabilities; respond to interference; and deny, if necessary, adversaries the use of space capabilities hostile to U.S. national interests.”

China, on conducting its military activities in Outer Space, also shown the same implication on developing its aggressive military space capabilities. It pursues a more asymmetric means of combat and a revolution in military affairs.¹¹⁶

Lastly, we may look on the result these activities caused. The main result of weapon testing in Outer Space are debris. The Outer Space Treaty under article IX stipulated that, state activities in Outer Space must not caused any harmful contamination or harmful interference of other state activities.¹¹⁷ However, it was not further explained on how harmful interference or harmful contamination may be defined.¹¹⁸ In an effort of defining harmful contamination or harmful interference, we can categorize it to physical interference and non-physical interference. Physical interference is the most obvious kind, which may be caused by projectile weapon, energy weapon, or satellite maneuvering in order to collide with other satellites and it may cause physical damages, often permanent.¹¹⁹ Non-physical interference on the other hand, may happen when a state conduct non-physical activities that resulted in non-permanent temporary damages to space assets¹²⁰

¹¹⁶ Baohui Zhang, “The Security Dilemma in the U.S.-China Military Space Relationship: The Prospect for Arms Control”, *Asian Survey*, 51:2 (March-April 2011), p. 312.

¹¹⁷ Eligar Sadeh, “International Space Governance: Challenges for the Global Space Community” in R. Venkata Rao, *et al.*, *Recent Developments in Space Law, Opportunities & Challenges*, (Singapore: Springer Nature Singapore Pte Ltd, 2017), p. 52.

¹¹⁸ Promit Chatterjee, “Legality of Anti-Satellites Under Space Law Regime”, *Astropolitics*, 12:1 (2014), p. 39.

¹¹⁹ Samuel Black, “No Harmful Interference with Space Objects: The Key to Confidence Building”, *Stimson Center Report*, 69 (July 2008), p. 5.

¹²⁰ *Ibid.*

VI.CONCLUSION

Based on the exposition above, I conclude, that up to this point, there is an absence or vacuum of law on the military activities in Outer Space, specifically regarding the aggressive activities. Stipulations presented in this article are not ample enough to directly regulate military activities in Outer Space. It requires further studies and perhaps, a drafting of a legal instrument to regulate the matter.

REFERENCES

Books

- Abdurrasyid, Priyatna. *Kedaulatan Negara di Ruang Udara*. 1st ed. Jakarta: Fikahati Aneska, 2003.
- Arbatov, Alexei and Vladimir Dvorkin. *Eds. Outer Space: Weapon, Diplomacy, and Security*. New York: Carnegie Endowment for International Peace, 2011.
- von Bogdandy, A. and R. Wolfrum. *Max Planck Yearbook of United Nations Law*. The Netherlands: Koninklijke Brill N.V., 2006.
- Chandrashekar, S. and Soma Perumal. *China's Constellation of Yaogan Satellites & the Anti-Ship Ballistic Missile*. Bangalore: National Institute of Advanced Studies, 2016.
- Chapman, Bert. *Space Warfare and Defense: A Historical Encyclopedia and Research Guide*. Santa Barbara: ABC-CLIO, 2008.
- Christol, Carl Q. *Space Law Past, Present, and Future*. Deventer: Kluwer Law and Taxation Publishers, 1991.
- Chun, Clayton. *Defending Space: U.S. Anti-satellite Warfare and Space Weaponry*. New York: Osprey, 2006.
- Cordesman, Anthony H. *Chinese Space Strategy and Development*. s.l.: Center for Strategic and International Studies, 2016.
- Cordesman, Anthony H. and Steven Colley. *Chinese Strategy and Military Modernization in 2015: A Comparative Analysis*. Washington D.C.: Center for Strategic and International Studies, 2015.
- Diederiks-Verschuur, I.H.Ph., and V. Kopal. *An Introduction to Space Law*. Cet. 3. Alphen Aan den Rijn: Kluwer Law International, 2008.
- von der Dunk, Frans and Fabio Tronchetti. *eds. Handbook of Space Law*. Cheltenham: Edward Elgar Publishing Limited, 2015.
- Hays, Peter L. *Space and Security: A Reference Handbook*. ABC-CLIO LLC: California, 2011.
- Heginbotham, Eric. *et al. The U.S.-China Military Scorecard: Forces Geography and the Evolving Balance of Power 1996-2017*. Santa Monica: RAND Corp., 2015.
- Johnson, Nicholas L. *et al. History of On-Orbit Satellite Fragmentations*. edisi 14. Houston: NASA Orbital Debris Program Office, 2008.
- Kan, Shirley. *China's Anti-Satellite Weapon Test*. Washington D.C.: Congressional Research Service, 2007.
- Lachs, Manfred. *The Law of Outer Space, An Experience in Contemporary Law Making*. Leiden: Martinus Nijhoff Publishers, 2010.
- Lambeth, Benjamin S. *Mastering the Ultimate High Ground: Next Steps in the Military Uses of Space*. Santa Monica: Rand Corporation, 1999.
- Lyll, Francis and Paul B. Larsen. *Space Law: A Treatise*. Cet. 1. London: Routledge, 2009.
- Mamudji, Sri. *et al. Metode Penelitian dan Penulisan Hukum*. Jakarta: Badan Penerbit Fakultas Hukum Universitas Indonesia, 2005.
- de Man, Philip. *Exclusive Use in an Inclusive Environment: The Meaning of the Non-Appropriation Principle for Space Resource Exploitation*. Switzerland: Springer International Publishing, 2016.
- Moltz, James Clay. *Crowded Orbits: Conflict and Cooperation in Space*. New York:

- Columbia University Press, 2014.
- O'Hanlon, Michael E. *Neither Star Wars nor Sanctuary: Constraining the Military Uses of Space*. New York: Brookings Institution Press, 2004.
- Page, Scott, *et al.* *The Global Positioning System: Assessing National Policies*. Santa Monica: RAND, 1995.
- Peterson, M.J. *International Regimes for the Final Frontier*. Ithaca: SUNY Press, 2005.
- Pollpeter, Kevin *et al.* *China Dream, Space Dream: China's Progress in Space Technologies and Implications for the United States*. s.l.:U.S. Government Publishing Office, s.n.
- Pramono, Agus. *Dasar-Dasar Hukum Udara dan Ruang Angkasa*. Cet. 1. Bogor : Penerbit Ghalia Indonesia, 2011.
- Schrogl, Kai-Uwe, *et al.* *Handbook of Space Security: Policies, Applications, and Programs*. Springer: New York, 2015.
- Sirohi, M. N. *Military Space Force and Modern Defense*. Alpha Editions, 2016.
- Soekanto, Soerjono. *Pengantar Penelitian Hukum*. Cet. 3. Jakarta: Penerbit Universitas Indonesia (UI-Press), 1986.
- Stürchler, Nikolas. *The Threat of Force in International Law*. New York: Cambridge University Press, 2007.
- Tronchetti, Fabio. *Fundamentals of Space Law and Policy*. New York: Springer, 2013.
- Wassenbergh, Henri A. *Principles of Outer Space Law in Hindsight*. Dordrecht: Martinus Nijhoff Publishers, 1991.
- Wilson, Jordan. *China's Alternative to GPS and its Implications for the United States*. Washington D.C.: U.S. Government Publishing Office, 2017.
- Wirbel, Loring. *Star Wars: US Tool for Space Supremacy*. London: Pluto Press, 2004.
- Wolter, Detlev. *Common Security in Outer Space and International Law*. Geneva: UNIDIR, 2006.
- Zhukov, Gennady and Yuri Kolosov. *International Space Law*. diterjemahkan oleh Boris Belitzky. Moscow: Statut, 2014.
- Zwaan, Tania L. *et al. eds.* *Space Law: Views of the Future*. Deventer: Kluwer Law and Taxation Publishers, 1988.

Articles and Papers

- Anantmula, Vishnu. "U.S. Initiative to Place Weapons in Space: The Catalyst for a Space-Based Arms Race with China and Russia". *Astropolitics* Vol. 11 No. 3 (2013).
- Black, Samuel. "No Harmful Interference with Space Objects: The Key to Confidence Building", *Stimson Center Report*, No. 69 (July 2008).
- Blount, P.J. "Targeting in Outer Space: Legal Aspects of Operational Military Actions in Space". *Harvard National Security Journal Features*. (2012).
- Bridge, Robert L. "International Law and Military Activities in Outer Space". *Akron Law Review*. Vol. 13 No. 4 (Spring, 1980).
- Chapman, Bert. "Chinese Military Space Power: U.S. Department of Defense Annual Report". *Astropolitics*. Vol. 14 No. 1. (2016).
- Chatterjee, Promit. "Legality of Anti-Satellites Under Space Law Regime".

- Astropolitics*. Vol. 12 No. 1 (2014).
- Dempsey, Paul Stephen. "Overview of the United States Space Policy and Law" dalam Ram S. Jakhu, *et al. National Regulations of Space Activities*. New York: Springer, 2010.
- Von der Dunk, Frans G. "The Delimitation of Outer Space Revisited, The Role of National Space Laws in the Delimitation Issues". *Proceedings of the 41st Colloquium on the Law of Outer Space (1998)*.
- Finch Jr., Edward R. "Outer Space for Peaceful Purposes". *American Bar Association Journal*. Vol. 54 No. 4 (April 1968).
- Freeland, Steven. "Peaceful Purposes? Governing the Military Uses of Outer Space". *European Journal of Law Reform*. Vol. 18 No. 1 (2015).
- Gorove, Stephen. *Et al.* "Arms Control in Outer Space". *Proceedings of the Annual Meeting (American Society of International Law)*. Vol. 76 (22-24 April 1982).
- Green, James A. and Francis Grimal. "The Threat of Force as an Action in Self-Defense Under International Law". *Vanderbilt Journal of Transnational Law*. Vol. 44 No. 285 (2011).
- Grego, Laura. "The Anti-Satellite Capability of the Phased Adaptive Approach Missile Defense System". *Federation of American Scientist Public Interest Report* (Winter 2011).
- Hagt, Eric and Matthew Durnin. "Space, China's Tactical Frontier". *Journal of Strategic Studies*. Vol. 34 No. 5 (2011).
- Hitchens, Theresa, *et al.* "U.S. Space Weapons". *The Nonproliferation Review*. Vol. 13 No. 1 (2006).
- Hitchens, Theresa. "A Recent Shift in U.S. Military Strategy and Provocative Actions by China Threatens to Ignite a New Arms Race in Space. But Would Placing Weapons in Space be in Anyone's National Interest?". *Scientific American*. Vol. 298 No. 3 (March 2008).
- Hosenball, S. Neil and Pierre M. Hartman. "The Dilemmas of Outer Space Law". *American Bar Association Journal*. Vol. 60 No. 3 (March 1974).
- Kelso, T.S. "Analysis of the 2007 Chinese ASAT Test and the Impact of its Debris on the Space Environment". Paper presented at *The Advanced Maui Optical and Space Surveillance Technologies Conference*. Hawaii, 2007.
- Khan, Saeed. "Space Law for Peace: A Critical Review". *Pakistan Horizon*. Vol. 59 No. 2 (April 2006).
- Koplow, David A. "ASAT-ism: Customary International Law and the Regulation of Anti-Satellite Weapons". *Michigan Journal of International Law*. Vol. 30. (Summer 2009).
- Lee, Ricky J. and Sarah L. Steele. "Military Use of Satellite Communications, Remote Sensing, and Global Positioning Systems in the War on Terror". *Journal of Air Law and Commerce*. Vol. 79 (2014).
- Lele, Ajey. "China's Posture in Space and Its Implication". *Strategic Analysis*. Vol. 32 No. 4 (2008).
- Liemer, Ross and Christopher Chyba. "A Verifiable Limited Test Ban for Anti-Satellite Weapon". *The Washington Quarterly*. Vol. 33 No. 3 (July 2010).
- Magraw, Daniel B. and Theresa Ketler. "Law Relating to Outer Space: A Bibliography-Part II". *The International Lawyer*. Vol. 20 No. 1 (Winter 1986).

- Mahajan, Vaydeesh. "Chinese Antisatellite Means: Critically and Vulnerability of Indian Satellites". *CLAWS Journal*. (Summer 2016).
- Maogoto, Jackson Nyamuya and Steve Freeland. "Space Weaponization and United Nations Charter Regime on Force: A Thick Legal Fog or a Receding Mist?". *The International Lawyer*. Vol. 41 No. 4 (Winter 2007).
- Menter, Martin. "Peaceful Uses of Outer Space and National Security". *The International Lawyer*. Vol. 17 No. 3 (Summer 1983).
- Menon, P.K. and William James Stover. "Demilitarization of Outer Space". *International Journal on World Peace*. Vol. 4 No. 2 (April-June 1987).
- Milowicki, Gene V. and Joan Johnson-Freese, "Strategic Choices: Examining the United States Military Response to the Chinese Anti-Satellite Test", *Astropolitics*, Vol. 6 No. 1 (2008).
- van Ness, Peter. "Building Security in Space: A Brief Introduction". *Asian Perspective*. Vol. 35 No. 4 Special Issue: Avoiding an Arms Race in Space (October-December 2011).
- Onley, Robert David. "Death from Above – The Weaponization of Space and The Threat to International Humanitarian Law". *Journal of Air Law and Commerce*. Vol. 78 (2013).
- Orr, Shannon. "Peace and Conflict in Outer Space". *Peace Research*. Vol. 30 No. 1 (Februari 1998).
- Peterson, M. J. "The Use of Analogies in Developing Outer Space Law". *International Organization*, Vol. 51 No. 2 (Spring 1997).
- Poduval, Sanjay. "China's Military Space Capabilities". *Maritime Affairs: Journal of the National Maritime Foundation of India*. Vol. 7 No. 2 (2011).
- Poduval, Sanjay. "China's Space and Counterspace Capabilities" dalam *Indian and American Perspectives on Technological Developments in the Maritime Domain and Their Strategic Implications in the Indian Ocean Region*. ed. Pradeep Kaushiva and Kamlesh K. Agnihotri. New Delhi: KW Publishers. 2013.
- Pollpeter, Kevin. "Space, the New Domain: Space Operations and Chinese Military Reforms". *Journal of Strategic Studies*. Vol. 39 No. 5-6 (2016).
- Sachdeva, G.S. "Select Tenets of Space Law as Jus Cogens" in *Recent Developments in Space Law*. eds. R. Venkata Rao, et al. Singapore: Springer, 2017.
- Sadeh, Eligar. "International Space Governance: Challenges for the Global Space Community" dalam *Recent Developments in Space Law*. eds. R. Venkata Rao, et al. Singapore: Springer, 2017.
- Schick, F. B. "Space Law and Space Politics". *The International and Comparative Law Quarterly*. Vol. 10 No. 4 (October 1961).
- Steinberg, Alan. "Weapons in Space: The Need to Protect Space Assets". *Astropolitics*, Vol. 10 No. 3 (2012).
- Su, Jinyuan. "The 'Peaceful Purposes' Principle in Outer Space and Russia-China PPWT Proposal". *Space Policy*. Vol. 26 (2010).
- Wolff, Johannes M. "'Peaceful Uses of Outer Space Has Permitted its Militarization- Does it Also Mean its Weaponization?'" *Disarmament Forum*. Vol. 1 (2003).
- Zhang, Baohui. "The Security Dilemma in the U.S.-China Military Space Relationship the Prospect of Arms Control". *Asian Survey*, Vol. 51 No. 2 (March/April 2011).
- Zhao, Yun. "Regulation of Space Activities in the People's Republic of China".

dalam Ram S. Jakhu, *et al.*, *National Regulations of Space Activities*. New York: Springer, 2010.

Thesis and Dissertation

- Dawson, Paul A. "The Legality of Self-Defense Regarding Dual-Use Space Objects". Tesis Master McGill University. Montreal, 2014.
- Hunter, Roger C. *A U.S. ASAT Policy for a Multipolar World*. Tesis School of Advanced Airpower Studies, Alabama, 1992.
- Lee, Daero. *Guidance, Navigation, and Control System for Autonomous Proximity Operations and Docking of Spacecraft*. Disertasi Missouri University of Science and Technology, 2009.

Laws, National and International Documents

- United Nations, Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, *UNTS* 1363 (1984).
- United Nations. COPUOS. *Guidelines for the Long Term Sustainability of Outer Space Activities*. A/AC.105/2016/CRP.17 (16 June 2016). http://www.unoosa.org/res/oosadoc/data/documents/2016/aac_1052016crp/aac_1052016crp_17_0_html/AC105_2016_CRP17E.pdf. Accessed on 26 December 2017.
- United Nations. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, *UNTS* 610 (1970).
- UNCOPUOS. *Note Verbale dated 8 June 1994 from the Permanent Representative of the United States of America to the United Nations (Vienna) addressed to the Secretary-General*. 9 June 1996. ST/SG/SER.E/274, <http://www.unoosa.org/oosa/osoinde/index/data/documents/us/st/stsgser.e274.html> . p. 12. Accessed on 12 December 2017.
- UNCOPUOS. *Note Verbale dated 4 June 1996 from the Permanent Representative of the United States of America to the United Nations (Vienna) addressed to the Secretary-General*. 1996. ST/SG/SER.E/310, <http://www.unoosa.org/oosa/osoinde/index/data/documents/us/st/stsgser.e310.html> . Annex p. 1. Accessed on 12 December 2017.
- UNCOPUOS. *Note Verbale dated 31 May 2001 from the Permanent Representative of the United States of America to the United Nations (Vienna) addressed to the Secretary-General*. 2001. ST/SG/SER.E/392, <http://www.unoosa.org/oosa/osoinde/index/data/documents/us/st/stsgser.e392.html> . p. 4. Accessed on 12 December 2017.
- UNCOPUOS. *Note Verbale dated 31 May 2002 from the Permanent Representative of the United States of America to the United Nations (Vienna) addressed to the Secretary-General*. 2002. ST/SG/SER.E/412, <http://www.unoosa.org/oosa/osoinde/index/data/documents/us/st/stsgser.e412.html> . Annex p. 4. Accessed on 12 December 2017.
- UNCOPUOS. *Note Verbale dated 27 August 2003 from the Permanent Representative of the United States of America to the United Nations (Vienna) addressed to the Secretary-General*. 2003. ST/SG/SER.E/434. <http://www.unoosa.org/oosa/osoinde/index/data/documents/us/st/stsgser.e434.html> . Annex p. 2. Accessed on 12 December 2017.

U.S. Department of Defense. *Annual Report to Congress: Military and Security Development Involving the People's Republic of China 2014*. Washington D.C.: Office of the Secretary of Defense, 2014.

U.S. Joint Chiefs of Staffs. *Joint Publication on Space Operation*. s.l.: s.n., 2013.

News and Other Webpages

Barbosa, Rui C. "Long March 3B Launches with ChinaSat 2C". *nasaspaceflight.com*. <https://www.nasaspaceflight.com/2015/11/long-march-3b-lofts-chinasat-2c/>. 3 November 2015. Accessed on 18 December 2017.

China Space Report. *Gaofen (High Resolution)*. <https://chinaspacereport.com/spacecraft/gaofen/#gf9>. Accessed on 18 December 2017.

China Space Report. *Tianhui (Sky Drawing)*. <https://chinaspacereport.com/spacecraft/tianhui/#missions>. Accessed on 18 December 2017.

David, Leonard. "Russian Satellite Hit by Debris from Chinese Anti-Satellite Test". *Space.com*. <https://www.space.com/20138-russian-satellite-chinese-space-junk.html>. 8 March 2013. Accessed on 18 December 2017.

Gray, Melissa. "Chinese Space Debris Hits Russian Satellite, Scientists Say". *CNN.com*. <http://edition.cnn.com/2013/03/09/tech/satellite-hit/index.html>. (10 March 2013). Accessed on 19 December 2017.

Kelly, Patrick. "Preemptive Self-Defense, Customary International Law, and the Congolese Wars". *E-International Relations Student*, www.e-ir.info/2016/09/03/preemptive-self-defense-customary-international-law-and-the-congolese-wars/. (2016). Accessed on 25 December 2017.

Kelso, T.S. *Chinese ASAT Test Coverage*. <https://celestrak.com/events/asat.as> last updated on 2012. Accessed on 20 December 2017.

McGill University. *Manual on International Law Applicable to Military Uses of Outer Space*. <https://www.mcgill.ca/milamos/>. Accessed on 26 December 2017.

Siddiqui, Sabena. "Pakistan Benefits from China's Sat-Nav System". *China.org.cn*, http://www.china.org.cn/business/2017-05/23/content_40873203.htm. 23 May 2017. Accessed on 18 December 2017.

Union of Concerned Scientist. *UCS Satellite Database*. www.ucsusa.org/nuclear-weapons/space-weapons/satellite-database#.Wi9YWkxuK02. Accessed on 12 December 2017.

Weeden, Brian. "Anti-Satellite Test in Space – The Case of China". *Secure World Foundation*. https://swfound.org/media/115643/china_asat_testing_fact_sheet_aug_2013.pdf. (2013). Accessed on 19 December 2017.

Weeden, Brian. "Through a Glass, Darkly: Chinese, American and Russian Anti-Satellite Testing in Space". *Secure World Foundation*. https://swfound.org/media/167224/through_a_glass_darkly_march2014.pdf. (2014). Accessed on 21 December 2017.