THE LEGALITY OF SELF-DEFENSE REGARDING DUAL-USE SPACE OBJECTS

by

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ABSTRACT

Outer space has become more congested, competitive and contested. Everyday functions depend on space-based assets to perform simple feats that allow you to carry on your day. This same forum is also where the most advanced militaries in the world plan to apply force and dominate the battle space to defeat any hostile action against it. Self-Defense, individual or collective, are highly dependent on a State's ability to develop technology and employ it successfully to counteract any threats. Weapons development is evitable, but like nuclear weapons, such weapons can create peace and stability through deterrence. The implications of a new defensive paradigm and dynamic military applications will globally challenge space governance surrounding the existing legal frameworks under international telecommunications law, international space law and international humanitarian law.

This thesis addresses these and related issues in three chapters. Chapter One lays out the operational framework that is applied to outer space, the various threats to space-based assets and the assertion of self-defense. Chapter Two provides an overview of U.S. and Chinese Space Policy to include each State's position on dual-use technology, militarization and perspective on the "peaceful uses" of outer space. Chapter Three examines the legal authorization of what force can be applied in self-defense in and through outer space from a military and commercial perspective. This paper covers how commercial entities could apply force and exercise the right to protect a State's critical infrastructure and the inability of the international community to intervene and provide solutions to issues of physical harm and interference.

RÉSUMÉ

L'Espace est devenu encombré, compétitif et contesté. Les activités de la vie quotidienne dépendent de moyens basés dans l'Espace accomplissant de petites prouesses. C'est aussi le lieu où les armées les plus avancées du monde comptent utiliser la force et dominer la bataille de l'espace pour lutter contre les actes d'hostilité. La légitime défense, individuelle ou collective, est particulièrement dépendante de la capacité d'un Etat à développer des technologies et à les appliquer avec succès pour contrer une menace. Le développement des armes n'est pas inévitable, mais comme les armes nucléaires, elles peuvent instaurer paix et stabilité par la dissuasion. Les conséquences d'un nouveau paradigme de défense et les applications militaires dynamiques vont, à l'échelle mondiale, s'opposer à la gouvernance spatiale entourant le cadre juridique actuel en droit international des télécommunications, en droit international spatial et en droit humanitaire international.

Ce mémoire adresse ces problématiques en trois chapitres. Un premier chapitre présente le cadre opérationnel appliqué à l'Espace, les diverses menaces pour les moyens basés dans l'Espace ainsi que l'affirmation de la légitime défense. Un deuxième chapitre donne une vue d'ensemble des politiques spatiales américaines et chinoises incluant la position de chaque Etat sur les technologies à double usage, la militarisation et une perspective sur « l'utilisation pacifique » de l'Espace. Enfin, un troisième chapitre examine les autorisations juridiques concernant les utilisations de la force pouvant être appliquées à la légitime défense dans et à travers l'Espace d'un point de vue militaire et commercial. Ce document explique comment les entités commerciales pourraient appliquer l'usage de la force et exercer le droit de protéger les infrastructures cruciales d'un Etat ainsi que l'incapacité de la communauté internationale à intervenir et proposer des solutions aux problèmes relatifs aux dommages physiques et aux interférences.

ACRONYMS AND ABBREVIATIONS

AFDD	Air Force Doctrine Document
AFSPC	Air Force Space Command
ASAT	Anti-Satellite Weapon
CJCS	Chairman of the Joint Chiefs of Staff
CNS	James Martin Center for Nonproliferation Studies
DARPA	Defense Advanced Research Projects Agency
DEW	Directed-Energy Weapon
DIA	Defense Intelligence Agency
DoD	Department of Defense
DTIC	Defense Technical Information Center
FAS	Federation of American Scientists
FEL	Free-Electron Laser
HEL	High-Energy Laser
HPM	High-Power Microwave
GEO	Geosynchronous Orbit
GPS	Global Positioning System
ICJ	International Court of Justice
ICTY	International Criminal Tribunal for the Former Yugoslavia
IHL	International Humanitarian Law
ITU	International Telecommunications Union
ISL	International Space Law
LOAC	Law of Armed Conflict
LEO	Low Earth Orbit
LOW	Law of War
MOOTW	Military Operations Other Than War
NASA	National Aeronautics and Space Administration
NSS	National Security Strategy
OST	Outer Space Treaty
PAROS	Prevention of an Arms Race in Outer Space
PCIJ	Permanent Court of International Justice
PPWT	Prevention of the Placement of Weapons Treaty in Outer Space and Threat or Use of Force Against Space Objects
ROE	Rules of Engagement
SROE	Standing Rules of Engagement
U.S.	United States
USAF	United States Air Force
U.N.	United Nations

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INTRODUCTION:

> There can be no doubt that the freedom of action of States in outer space… is neither unlimited nor absolute and unqualified, but is determined by the right and interest of other States. It can therefore be exercised only to the extent to which as indicated it does not conflict with those rights and interests.[1] – *Manfred Lachs*

The occupation of space without ownership is occurring based on the sheer volume of physical objects in outer space. The nature of dual-use technology, more specifically military applications within commercial space technology or with future commercial viability, has further complicated the use of space. As commercial satellite systems evolve and play a greater role in our daily lives[2], they also have the ability to support military operations as well as becoming lawful targets.[3] These types of attacks may not only be for a military advantage, but also to effectuate an economic advantage or perhaps hinder or stop economic development.[4] Today, world economies are more integrated. Thus, the protection of a State's assets and interests are always in the forefront

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[1] MANFRED LACHS, THE LAW OF OUTER SPACE: AN EXPERIENCE IN CONTEMPORARY LAW-MAKING 117 (Martinus Nijhoff Publishers, 2010) (1972).

[2] Sydney J. Freedberg Jr., *US Can't 'Stick Our Heads In The Sand' On Space Threats: Gen. Shelton*, 22 July 2014, online: Breaking Defense, <http://breakingdefense.com/2014/07/us-cant-stick-our-heads-in-the-sand-over-rising-threats-to-space-gen-shelton/> (accessed 30 July 2014) [hereinafter Freedberg].

[3] Michel Bourbonniére, "Law of Armed Conflict (LOAC) and the Neutralisation of Satellites or *Ius In Bello Satellitis*" (2004) 9:1 J Confl & Sec L 43 at 58[hereinafter Bourbonniere-LOAC]; see generally, Sarah M. Mountin (Major, USAF), *The Legality and Implications of Intentional Interference with Commercial Communication Satellite Signals,* (LL.M, McGill University Institute of Air & Space Law, 2013) [unpublished] [hereinafter Mountin] (This author concluded that force can be applied defensively and such intentional interference may be tantamount to an armed attack or sufficient gravity to warrant action.); P.J. Blount, "Targeting in Outer Space: Legal Aspects of Operational Military Actions in Space," 25 November 2012, *Harvard Law School National Security Journal Features* (Online Content), online: Harvard National Security Journal, <http://harvardnsj.org/2012/11/targeting-in-outer-space-legal-aspects-of-operational-military-actions-in-space/> (accessed 15 July 2014); and Christopher M. Petras (Major, USAF), "THE USE OF FORCE IN RESPONSE TO CYBER-ATTACK ON COMMERCIAL SPACE SYS-TEMS--REEXAMINING "SELF-DEFENSE" IN OUTER SPACE IN LIGHT OF THE CONVERGENCE OF U.S. MILITARY AND COMMERCIAL SPACE ACTIVITIES," *Journal of Air Law and Commerce*, Fall 2002, 67 J Air L & Comm 1213.

[4] Deborah Housen-Couriel, "Disruption of Satellite Transmissions *ad Bellum* and *in Bello*: Launching a New Paradigm of Convergence" (2012) 45:3 Isr LR 431, 437 [hereinafter Housen-Couriel]; David A. Koplow, "ASAT-isfaction: Customary International Law and the Regulation of Anti-Satellite Weapons" (2009) 30 Mich J Int'l L 1187 at 1190; Lawrence T. Greenberg, et al, *Information Warfare and International Law* (National Defense University Press, 1998) at 1. For a general ASAT history, see Laura Grego, "A History of Anti-Satellite Programs" (January 2012), online: Union of Concerned Scientists < http://www.ucsusa.org/assets/documents/nwgs/a-history-of-ASAT-programs_lo-res.pdf> (accessed 12 April 2014).

of international discussions. A State's sovereignty and security over territory have not only dominated discussions among the international community, but have become a stumbling block for international consensus. This thesis will cover the use of potentially destructive technologies by both military and commercial operators in securing and protecting national space assets. Given these dangers of integrating dual-use technologies, this paper will discuss how commercial entities could use force to defend their systems against harm and how such actions support a State's right to defend its critical infrastructure.

Chapter One discusses potential threats to the operational uses of space assets, applicable space law, and the right to exercise self-defense. The interplay between terms such as "armed attack," "use of force," "self-defense," "countermeasures" and "anticipatory self-defense" will be described and this will paint a picture of limits on aggressive space operations and the use of technology for non-peaceful purposes. In addition, the chapter will discuss how Rules of Engagement (ROE), as used by those engaged in self-defense activities in support of space systems, are governed by international law, notwithstanding the inherent and absolute right to self-defense, both individually and collectively.

Chapter Two compares the national policies and legislative modalities behind the space programs of the United States of America (U.S.) and The People's Republic of China (China). This review also encompasses the national policies regarding dual-use technology and the militarization and peaceful uses of outer space. Technological development and advancement have been a priority of both military and commercial space applications. These space systems are vital to national security and critical in advancing national objectives and achieving a wide range of effects. Within this chapter, new and potential space-based assets from the U.S. and China are highlighted as well the dual-use technology being implemented by these platforms.

Such dual-use systems have the capacity to attack satellites like a military space weapon and at the same time perform commercial applications under the "nonaggressive" use of space.

In Chapter Three, based on the foregoing theoretical analysis and review, States are likely to employ military weapons or commercial applications to protect these national security assets. Robotic arms and drone spacecraft with shuttle bays are two technologies that have or are being developed by U.S. and Chinese space programs. These reusable platforms could be easily equipped with specific tools to serve as weapons. These tools could include directed energy weapons, conventional kinetic weapons, and non-kinetic weapon technologies (i.e. jammers, lasers, dazzlers as the source of intentional harmful interference). This chapter covers the legal authorization behind the force that can be applied in self-defense in and through space from a military and commercial perspective. Commercial entities could apply force and with the consent of the affected State, exercise the right to protect a State's critical infrastructure. In the context of deep space exploration, commercial entities may unilaterally act to protect their personnel and property based on the lack of government oversight. Such actions are more likely to develop because of the inability of the international community to intervene[5] and provide solutions to issues of physical harm and interference.

[5] However, State intervention occurred in Operation Provide Comfort in Iraq (1991), or Operation Allied Force against the Federal Republic of Yugoslavia (1999) or even Operation Iraqi Freedom (2003), noted in Christine Gray, *International Law and the Use of Force* (Oxford: University Press, 2000) at 19. The ultimate success of the Iraq campaigns is somewhat questionable today.

CHAPTER ONE: THE USE OF OUTER SPACE AND THE RIGHT OF SELF-DEFENSE

> "All warfare is based on deception. Hence, when able to attack, we must seem unable; when using our forces, we must seem inactive; when we are near, we must make the enemy believe we are far away; when far away, we must make him believe we are near." [6]
> - *Sun Tzu*

A. The Freedom of Use and Exploration of Outer Space

The basic principle on the freedom of use and exploration of outer space is echoed in the five major outer space treaties.[7] However, this freedom of use and exploration of outer space is not without limitation. Article I of the Outer Space Treaty forms the foundation of the "common interests" principle that all countries rely upon for their claims of freedom of use, exploration, and most importantly access.[8] Specifically, Article I states:

> The exploration and use of outer space, including the moon and other celestial bodies, *shall be carried out for the benefit and in the interest of all countries*, *irrespective* of their degree of economic or scientific development, and *shall be the province of all mankind*.
>
> 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 co-operation in such investigation.[9]

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[6] Sun Tzu, *The Art of War*, translated by Samuel B. Griffith (Oxford, UK: Oxford University Press, 1963) [hereinafter Sun Tzu].

[7] *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, 27 January 1967, 19 UST 2410, 610 UNTS 205 (entered into force on 10 October 1967) [The Outer Space Treaty]; The Agreement on the Rescue of Astronauts and the Return of Objects Launched in Outer Space, 22 April 1968, 19 UST 7570, 672 UNTS 119 (entered into force on 3 December 1968) [The Return & Rescue Agreement]; Convention on International Liability for Damage Caused by Space Objects, 29 March 1972, 961 UNTS 187, 24 UST 2389 (entered into force 1 September 1972) [The Liability Convention]; Convention on Registration of Objects Launched into Outer Space, 14 January 1975, 28 UST 695, 1023 UNTS 15 (entered into force on 15 September 1976) [The Registration Convention]; Agreement governing the Activities of States on the Moon and Other Celestial Bodies, 18 December 1979, 1363 UNTS 3 (entered into force on 11 July 1984) [The Moon Agreement]*.

[8] OST, *Ibid*, art I; Nicolas M. Matte, ed., *Space Activities and Emerging International Law* (Montreal: Centre for Research of Air & Space Law: McGill University, 1984) at 270, 272.

[9] OST, *supra* note 7, *Ibid* [emphasis added].

Article II expressly establishes that States who are party to the treaty cannot own nor can they stake a claim of ownership over outer space or its celestial bodies, to include the Moon.[10] However, it is also commonly understood that space assets or objects are under the jurisdiction of those appropriate States which authorize and maintain continuing supervision over the legal entities that own or operate them.[11] This international responsibility to exercise jurisdiction and control over such space objects requires States to apply their own domestic legislation and supervision over such space activity.

Article III provides more guidelines to States by the application of international law and the United Nations (U.N.) Charter, specifically:

> States Party to the Treaty shall carry on activities in the exploration and use of outer space, including the moon and other celestial bodies, *in accordance with international law*, including the Charter of the United Nations, in the interest of *maintaining international peace and security* and *promoting international cooperation and understanding*.[12]

As other States become more active in outer space, they will continually assert these principles as a declaration regarding outer space as a *res communis* or simply "space is owned by no one but is free for use by everyone."[13] These developing States, like India, Brazil, and the Republic of Korea, are not alone. Even major space powers have asserted these principles to dominate their use and exploration of space as well as their own development of space assets, not only for their domestic security, but also to secure their stronghold on the economic boom within the space industry.

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[10] OST, *supra* note 7. The OST is the most ratified treaty among the 5 space treaties. In addition, this principle of non-appropriation of outer space has to a certain extent been recognized as a point of customary international law.
[11] OST, *supra* note 7, art VI. See also S.S. Wimbleton (United Kingdom v Germany) (1923), PCIJ (Ser A) No 1, 15 at 30; Factory at Chorzow, Jurisdiction (Germany v Poland) (1927) PCIJ (Ser A) No 9 at 21.
[12] OST, *supra* note 7, art III [emphasis added].
[13] Rochus Moenter, "The International Space Station Legal Framework and Current Status" (1999), 64 J Air L & Comm 1033 at 1039.

Commercial satellites are becoming even more prevalent than military satellites, as the number of States using space assets increases. International cooperation in outer space activities is growing. States must also manage their own self-interest while maintaining peace and security within the international community. This balancing of a State's interests is subject to a State's national security concerns, which appear to always overcome any considerations of accommodation of another State's interests. Thus, space is becoming more of a medium for developing technology to protect these interests. It is this protectionist activity, despite a general prohibition on the use of force[14], which is currently fueling mistrust and uncertainty regarding the freedom to use and explore outer space.

B. Natural and Man-Made Threats to the Right of Exploration and Use

There are significant threats, both natural and man-made, that jeopardize the use and exploration of space. From asteroids to jamming, the use of space can only be described as an ultra-hazardous environment.[15] Although natural hazards from solar flares and asteroids are serious, there is a more escalatory threat of man-made interference or actions, which in various forms can be the result of direct and intentional acts.

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[14] UN, *Charter of the United Nations*, 26 June 1945, Can TS 1945 No 7, art 2(4) [hereinafter UN Charter]. Article 2(4) of the U.N. Charter discusses certain uses of force as wrongful. While the notion on the use of force is not clear within international community, some jurists suggest it as action taken by "*armed force*" via use of a weapon to inflict injury. Military actions are considered to be armed force in certain circumstances. There are peaceful military actions that do not involve the use of force, such as humanitarian aid and scientific exploration of outer space. However, all activities related to hostile military action, from the transfer of soldiers and tanks to country borders to the act of war, such as dropping bombs and firing artillery are always considered to be "*armed force*". Such military force appears to be the sole focus of the Article 2(4) prohibitions on the use of force within the U.N. Charter *travaux preparatoires* and the *Declaration on Principles of International Law, Friendly Relations and Co-Operation among States in accordance with the Charter of the United Nations,* GA Res 2625 (XXV), UN GAOR, 25th Sess, Supp No. 18, UN Doc A/8082 (1970) [hereinafter General Assembly Resolution 2625 (XXV)]. Nations may limit their application of force by rules of engagement (ROE). This coincides with the *jus ad bellum*, the law governing the use of force: The Rome Statute is "an authoritative Indicator of evolving customary international law on this point": ICTY, *Final Report to the Prosecutor by the Committee Established to Review the NATO Bombing Campaign against the Federal Republic of Yugoslavia*, 13 June 2000, paras 22 and 30 ["In brief, the *jus ad bellum* regulates when states may use force and is, for the most part, enshrined in the UN Charter"].

[15] W. Jenks, "The Scope and Nature of Ultra-Hazardous Liability in International Law," *Recueil des Cours*, vol 117, (1966), at 55.

Jamming of signal transmissions is one method of causing intentional interference.[16] This intentional broadcast of the same frequency at a higher concentration or power level can be applied in a non-kinetic manner or by the addition of new technology designed to be attached to the source and prevent transmission or reception of the applicable signal.[17] In addition, jamming occurs by various forms of intentional interference[18] and can also be difficult to identify the exact source of such interference, especially if the source is covertly attached to the space asset itself. To complicate the issue of addressing threats, jammed signal transmissions could be caused unintentionally by space operators, malfunctioning equipment, poor installation, or irresponsibly operating outside of allotted radio frequencies.[19] The International Telecommunication Union has attempted to address harmful interference within the electronic spectrum; however, there is no liability for noncompliance[20] and intentional harmful interference can remain unresolved because diplomatic discussions breakdown or are unsuccessful.[21]

Another concern to space asset operators and owners and the use of outer space are anti-satellite (ASAT) weapons.[22] These weapons can be crude, cheap and highly effective in creating havoc in and out of space. They are a clear threat to space-based assets or weapon systems. Space-

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[16] Eytalis, *Ibid*, at 14; Hank Rausch, *Jamming Commercial Satellite Communications During Wartime: An Empirical Study: Proceedings of the Fourth IEEE International Workshop on Information Assurance, 2006* (Royal Holloway, United Kingdom, 2006); Housen-Couriel , *supra* note 4, at 437; Robin Geiß and Henning Lahmann, *CYBER WARFARE: APPLYING THE PRINCIPLE OF DISTINCTION IN AN INTERCONNECTED SPACE*, (2012) Isr LR 45, at 384. Rules of *jus in bello* apply to space and cyberspace.

[17] Eytalis, *supra* note 21, at 7; see also Mountin, *supra* note 3, at 40.

[18] James G. Savage, *The Politics of International Telecommunications Regulation* (Boulder, San Francisco & London: Westview Press, 1989) at 134; Housen-Couriel, *supra* note 4, at 436.

[19] Jakhu & Singh-Space Security, *supra* note 21, at 83-85.

[20] *Constitution of the International Telecommunications Union, 22 December 1992, 1825 UNTS 331, (1994) ATS 28, (1996) BTS 24 (entered into force 1 July 1994)*, art 36 [hereinafter ITU Constitution].

[21] Ram Jakhu & Karan Singh, *Space Security and Competition for Radio Frequencies and Geo-stationary Slots*, 58 ZLW 79, 83–85 (2009)[hereinafter Jakhu & Singh-Space Security]; Zachary Eytalis, *International Law and the Intentional Harmful Interference with Communication Satellites* (LL.M Thesis, McGill University Institute of Air and Space Law, 2012) [unpublished] [hereinafter Eytalis] .

[22] US, United States Air Force, *Counterspace Operations*, Air Force Doctrine Document 2-2.1 (2 August 2004) at 33. Antisatellite weapons are defined to "include direct ascent and co-orbital systems that employ various mechanisms to affect or destroy an on-orbit spacecraft." *Ibid.*

based assets tend to follow a highly predictable path and do not require a direct kinetic strike to become disabled or destroyed.[23] Mere fragments from an ASAT, other weapon or an explosive blast can be sufficient to complete the task.[24] These weapon platforms can include nuclear-armed ASATs. In addition, nuclear powered satellites can be directed to destroy other space objects or deorbited back to earth as another form of a weapon of last resort.[25]

With the Chinese ASAT test in 2007, the international community understands the clear and present dangers ASATs can cause based on the debris field created with the destruction of a high orbit satellite. This harm is not solely isolated to a State's enemies, but also to their own space assets because of the tremendous debris field created via their use and for hundreds of years that follow. Space or orbital debris[26] can be another form of a last resort weapon. A State, with the destruction of space assets, can generate turmoil and havoc in outer space with a massive debris field that could preclude others from using space at all. Although such action would be condemned by the international community, it does appear that States have the legal right to test ASAT weapons. Russia, China and the U.S. have done so without any long-term hindrance in the development of their space programs.

There are kinetic and conventional weapons that can be used to destroy, disrupt or deorbit space-based assets. A pellet cloud of debris containing explosive charges delivered to LEO or any

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[23] See generally, David Wright, et al, *The Physics of Space Security: A Reference Manual* (Cambridge, MA: American Academy of Arts and Sciences, 2005).

[24] Pavel Podvig and Hui Zhang, *Russian and Chinese Responses to U.S. Military Plan in Space*, (American Academy of Arts and Science, 2008), at 57, online: Academy of Arts and Science, <https://www.amacad.org/content/publications/publication.aspx?i=343> (accessed 20 May 2014) [hereinafter Podvig & Zhang]: "ASAT weapons may be based on the ground, in the air, at sea, or in space. They may be designed to destroy their target using a kinetic energy weapon (KEW), DEW, or an explosive charge, or disable their target temporarily with devices such as jammers or other electronic or electro-optical countermeasures or both."

[25] Nuclear Satellites as space weapons would be banned by Article IV of the Outer Space Treaty as these nuclear devices would orbit the Earth. Michael Listner, "An exercise in the Art of War: China's National Defense white paper, outer space, and the PPWT," *The Space Review*, 25 April 2011, online: thespacereview.com, <http://www.thespacereview.com/article/1828/1> (accessed 15 October 2013) [hereinafter Listner].

[26] US, The White House, *Interagency Report on Orbital Debris*, Office of Science and Technology Policy (November 1995), at 3; see also UN, Committee on the Peaceful Uses of Outer Space (COPUOS), Legal Subcommittee, 665th Meeting, UN Doc COPUOS/LEGAL/T.665 (8 April 2002), at 9.

orbit by a missile is another threat. These space mines with conventional charges are a means to threaten space-based assets. These types of space weapons are highly provocative when taking into account the collateral and long term impacts of debris fields at higher orbits.

Outside of missiles and other conventional threats to space based assets, there has emerged advancement in directed-energy weapons (DEW). DEWs deliver focused beams of energy to an object in order to disable, damage or destroy it. These DEWs can come in a variety of capabilities and can be based on land, sea, air or in space. High-energy laser (HEL) weapons generate powerful electromagnetic radiation beams that can destroy or jam communication or sensory functions of space-based assets or even ground based assets on Earth.[27] These types of threats can be based in space or launched from ground, sea or air platforms. These weapons systems required a significant energy source to generate its destructive force which makes these threats more effective as ground or sea-based weapon. These chemical lasers, nuclear pumped X-ray lasers or free-electron lasers (FEL) began to emerge as weapon technologies within the U.S. Strategic Defense Initiative.[28] However, the U.S. has not been alone in developing these systems. China also has a history of

[27] Mark E. Rogers (Lieutenant Colonel, USAF), *Lasers in Space Technological Options for Enhancing US Military Capabilities*, Center for Strategy and Technology, Air War College, (Maxwell Air Force Base, Alabama, November 1997) at 22; Tom Wilson, *Threats to United States Space Capabilities, Prepared for the Commission to Assess United States National Security Space Management and Organization*, 2000, online: Federation of American Scientists, <http://fas.org/spp/eprint/article05.html> (accessed 14 July 2014); Brandon Hart, *Anti-satellite weapons: threats, laws and the uncertain future of space*, (LL.M), (McGill University Institute of Air & Space Law, 2007), [unpublished], at 38-40; Rick Patenaude (Colonel, USAF), "Prompt Global Strike Update" (August 2005), slide 5, online: Arms Control Wonk.com, <http://lewis.armscontrolwonk.com/archive/1455/asats-and-crisis-instability> (accessed 18 July 2014); Times Staff and Wire Report, "Boeing Team Wins $1.1-Billion Contract for Laser-Armed Plane," *Los Angeles Times*, 13 November 1996, online: articles.latimes.com, <http://articles.latimes.com/1996-11-13/business/fi-64086_1_boeing-team> (last accessed 18 July 2014). However, these space-based assets can be shielded. Loren B. Thompson, "Lack of Protected Satellite Communications Could Mean Defeat for Joint Force in Future War" Lexington Institute Early Warning Blog (14 April 2010), online: Lexington Institute <http://www.lexingtoninstitute.org/lack-of-protected-satellite-communications-could-mean-defeat-for-joint-force-in-future-war> (accessed 12 July 2014).

[28] Carlo Kopp, "High Energy Laser Directed Energy Weapons, Technical Report APA-TR-2008-0501," updated and expanded using *Defence Today*, 2006 series, updated April 2012, online: ausairpower.net, <http://www.ausairpower.net/APA-DEW-HEL-Analysis.html> (last accessed 18 July 2014).

testing and developing these types of weapons dating back to at least 1993.[29] FELs generate intense beams of energy which operate at shorter wavelengths and can carry over long distances. High-powered microwave (HPM) weapons produce a strong beam of radio frequency radiation. These weapons can be used to destroy electronic equipment utilized by space assets or may be used to temporarily jam such equipment. These cheap and repeatable beams of energy represent a growing threat as technology allows for smaller modules that can support these types of space applications.

Another growing threat to space assets is the proliferation of smaller and smaller satellites. The sheer volume of these smaller satellites present collision dangers, but these types of satellites could also target another State's space assets intentionally. Disaggregation and the propagation of smaller satellites provides resiliency and advanced placement of new technology rather than waiting 15 to 20 years for the term-life associated with current satellites. In addition, the smaller the space asset, the lower it will cost to enter the space race for developing nations and significantly reduce the payload requirements increasing a State's ability to launch on-demand. Developing these tiny satellites for missions that include data transmission, Earth-sensing, and other civilian programs also may present a congestion problem outside of the potential lack of control mechanisms endangering larger satellites. Philip Saunders noted, the technology "would potentially allow for lower cost access to space, enhanced maneuverability, and increased ability to launch-on-demand."[30]

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[29] Paul S. Oh, (Major, US Army), *Assessing Chinese Intentions for the Military Use of the Space Domain*, School of Advanced Military Studies, United States Army Command and General Staff College, (Kan, AY 2011), at 24 [hereinafter Assessing Chinese Intentions].

[30] Philip Saunders, Jingdong Yuan, Stephanie Lieggi, and Angela Deters, "China's Space Capabilities and the Strategic Logic of Anti-Satellite Weapons," *James Martin Center for Nonproliferation Studies*, research story of the week (22 July 2002), online: Center for Nonproliferation Studies, <http://cns.miis.edu/stories/020722.htm> (accessed 18 July 2014).

However, despite these technologies being potentially used as space weapons, they are commercially viable technologies that can generate revenue for States from new cost-effective launch vehicles to various telecommunication applications.[31] As more States gain revenue from space applications, those same sources of revenue can be utilized in aggressive actions in space. For example, the development of small satellites would enable a more rapid launching rate and allow launchers to be mobile, which are also critical factors in a space-based war.[32] Moreover, these microsatellites could be hidden in host or carrier satellites and the covertly deployed to rendezvous with other space assets to gather intelligence used to target a satellite or its functions or perform other missions to disrupt, degrade or destroy another State's space assets. These tiny satellites could attach themselves to other satellites and perhaps even override or take control of its functions.[33]

All of this existing technology has emerged as dual-use applications that present a new threat to space-based assets. Another example under current development are on-orbit space asset servicing containing the ability to repair and protect as well as disrupt, deorbit, nullify, takeover or destroy another State's space assets. On-orbit servicing technologies can include satellite refueling, satellite repair or construction, and space debris mitigation. These particular space-based platforms are already equipped with defensive measures as the tools and resources required to perform their commercial functions. These space platforms are inherently dangerous because they can serve a more offensive purpose. To the extent that these platforms can be used to perform

[31] Henry R. Hertzfeld, Ray A. Williamson, and Nicolas Peter, "LAUNCH VEHICLES: AN ECONOMIC PERSPECTIVE", *Space Policy Institute*, (George Washington University, September 2005) at 25. Alex A. Kazemi, "Intersatellite laser communication systems for harsh environment of space," *Proceedings of Society of Photo-Optical Instrumentation Engineers (SPIE)*, Vol 8720, (Photonic Applications for Aerospace, Commercial, and Harsh Environments vol IV, no 872010, 31 May 2013). Lasers are a method of providing telecommunication.
[32] Howard DeVore, "China's Aerospace and Defense Industry," *Jane's Special Report* (December 2000): 197–200.
[33] Joan Johnson-Freese, "China's Manned Space Program: Sun Tzu or Apollo Redux" (Summer 2003), *The Naval Law Review*, vol LVI, no 3, at 66.

as potential space weapons, it opens the door to these space-based assets being targeted by other States.[34]

C. Legality of Targeting the Operational Nature of Dual-Use of Space Assets

Space controllers or satellite operators[35] must rely on their licensing authority to outline what conduct is acceptable within their space operations. These areas of domestic legislation are still being created and further developed. It is unclear how a State's military operations are being conducted, outside of those States that publicize their operations. If a State is less transparent regarding their space operations, then that lack of public disclosure pushes other States to conduct their space operations in a similar fashion. Space does not have lanes of traffic or even traffic cops. Thus, space operators are left to operate with little guidance regarding the use of space, but it appears that each follows a similar model found in the Outer Space Treaty and the Chicago Convention, one of "Due Regard." "Due Regard" is the principle where situational awareness is critical. It is found in Article IX of the Outer Space Treaty:

> In the exploration and use of outer space, including the moon and other celestial bodies, State Parties to the Treaty shall be guided by the principle of co-operation and mutual assistance and *shall conduct all of 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.[36]

This principle is embodied in Article 3 of the Chicago Convention and has been successful in guiding the operation of State and Military aircraft since 1944. These aircraft do not fly traditional or delineated routes, but operate under a "Due Regard" principle to take the initiative

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[34] Bourbonniére-LOAC, *supra* note 3, at 58. Michel Bourbonniére and Ricky Lee, "Legality of the Deployment of Conventional Weapons in Earth Orbit: Balancing Space Law and the Law of Armed Conflict," *The European Journal of International Law*, vol 18, no 5, 873 (2007), at 875 [hereinafter Conventional Weapons].

[35] Space controller or satellite operator in the context of this thesis means the individual or automated system that controls or manipulates the physical flight characteristics, if available, of the space-based asset regardless of location.

[36] OST, *supra* note 7, art IX [emphasis added].

and operate without interfering with commercial aviation.[37] Operating with "Due Regard" is fundamental to peace and stability because it creates operational respect and trust that enables other operators or pilots to fly with confidence. This principle is also critical in space operations. However, the more outer space becomes congested and contested, the more this trust and respect are degraded to the point where mistrust and suspicion fill the void.

Since the age of ballistic missiles, space has been used to perform operational requirements of a State, for scientific or military purposes. The legal issues surrounding targeting or use of force against space based assets remain unsettled because the application of force can be accomplished without any physical contact and the current methods of warfighting still rely on the subjective interpretation of whether or not a perceived threat or the type of harm suffered is sufficient to warrant an all-out or reciprocal response. The types of responses could range from interfering with the operational capabilities of the space-based threat, to include, but not being limited to, jamming, capturing or destroying another State's space assets.

Under international law and the law of war, a State can lawfully target a space asset of another State so long as the target serves a military objective[38] or is justifiably defensive in nature. The targeting State must have sufficient subjective justification for using such force or action against another State. If a space object can be targeted for a military objective or superiority, then it is fair to conclude that such threat of force would allow a State to take necessary precautions to protect and secure such critical space assets and to an extent deter the other State from applying such force. A State can use force unilaterally without any provocation; however, such use of force

[37] International Civil Aviation Organization (ICAO), *Convention on Civil Aviation ("Chicago Convention")*, 7 December 1944, (1994) 15 UNTS 295, art 3(d). Article 3(d) of the Chicago Convention addresses State and Military aircraft: "The contracting States undertake, when issuing regulations for their state aircraft, that they will have due regard for the safety of navigation of civil aircraft."
[38] Conventional Weapons, *supra* note 34, at 899.

would be in violation of the U.N. Charter. Another State (the targeted State) has the ability, and more importantly the inherent right, to defend itself.

D. Use of Force and The Inherent Right of Self-Defense

Not only is outer space an ultra-hazardous environment, it has now become a place where these new emerging threats endanger the free use of outer space. Even with a general prohibition on the use of force, States must rely on some fundamental rights, both under customary international law and under the U.N. Charter, to protect itself from harm. Each action by a State will be evaluated by the international community and the affected party seizing on the specific justification that underlie these rights of self-defense, both individually and collectively.[39]

The fear of another global war and its impact on society was the origin of the U.N. Charter, and those initial signatory States that adopted it in June 1945.[40] Although the U.N. Charter is a binding treaty, its principles have been reinforced in other international treaties, such as the Outer Space Treaty, incorporating its principles as binding treaty language between party States. The drafters of the U.N. Charter held out its most fundamental purpose in Article 1(1):

> To maintain international peace and security, and to that end: to take effective collective measures for the prevention and removal of threats to the peace, and for the suppression of acts of aggression or other breaches of the peace.[41]

The U.N. Charter goes further to outline addition limitations on States. Article 2(3) tasks all States who are members of the of the U.N., as well as those who are parties to the Outer Space Treaty, to settle any international disputes through peaceful means.[42] However, the most cited provision of the U.N. Charter regarding the use of force is its general prohibition in Article 2(4):

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[39] *Case Concerning Oil Platforms (Islamic Republic of Iran v United States),* [2003] ICJ Rep 161: Burden of proof is on the State asserting self-defense.
[40] UN Charter, *supra* note 14,
[41] *Ibid*, art I, para 1.
[42] *Ibid*, art. 2, para 3, states: "All Members shall settle their international disputes by peaceful means in such a manner that international peace and security, and justice, are not endangered."

> 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.[43]

Article 2(4) makes clear that any and all uses or threats of force, including the use of force in circumstances outside of war, are prohibited.[44] The application of Article 2(4) is binding against U.N. Member States against any other State, regardless of its membership in the U.N. However, there are two explicit exceptions: (1) U.N. Security Council Resolutions authorizing the use of force; or (2) the right of individual and collective self-defense.[45]

Security Council authorizations to use force are included within the U.N. Charter sanction provisions.[46] Here, both China and the U.S. maintain permanent seats on the Security Council – a position and benefit derived from being the victorious powers at the end of World War II. The Security Council's primary responsibility is maintaining international peace and security.[47] In performing that role, the Security Council exercises its authority to "determine the existence of any threat to the peace, breach of the peace, or act of aggression," and formulate what actions will be taken by States or by a collective of U.N. forces[48] "to maintain or restore…international peace and security."[49] Finally, the Security Council dictates what actions or "measures" are authorized, to include the use of force.[50] The Security Council decisions can be vetoed by any of the five

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[43] *Ibid*, art 2, para 4.
[44] Yoram Dinstein, *War, Aggression and Self-Defense* 81 (3rd ed. 2001) [hereinafter Dinstein-War]; Professor Dinstein concluded that "[t]he use of force in international relations, proscribed in the Article, includes war. But the prohibition transcends war and covers also forcible measures short of war." See also Clark Arend & Robert J. Beck, International Law and the Use of Force 12-13 (1993), at 31[hereinafter Arend & Beck].
[45] Bruno Simma, ed, *The Charter of the United Nations: A Commentary,* 2d ed (Oxford: University Press, 2002) at 117-118; see also Dinstein-War, *supra* note 44, at 81; 1 The Law of War: A Documentary History 3-5 (Leon Friedman ed., (1972).
[46] UN Charter, *supra* note 14, arts 29-51.
[47] UN Charter, *supra* note 14, art 24.
[48] UN Security Council can also deploy armed forces to secure peace and stability.
[49] UN Charter, *supra* note 14, art 39.
[50] Forcible measures under this exception may be carried out by UN forces, or by those of some or all of its members. See UN Charter, *supra* note 14, arts 25, 42, and 48. "The estimate has been made that while World War I caused 10 million deaths, of which 500,000 were civilians, World War II caused 50 million, of which 24 million were civilians." Howard S. Levie, "When Battle Rages, How Can Law Protect?," 24 *14th Hammarskjold Forum*

permanent members. However, in practice, the inability of agreement among the permanent members on resolutions, regardless of the underlying reasons, is perhaps the sole reason behind the Council's inaction.[51] Saudi Arabia has rejected an offer for a seat on the Security Council because of the lack of political will to intervene.[52] This stance by Saudi Arabia underscores what just-war theorists assert as the justification behind authorizing force to correct serious transgressions and re-establish peace and stability.

However, this ban on the use of force is not absolute, with most rules, there are exceptions. First, there is an explicit exception within the U.N. Charter on the use of force via the right of individual and collective self-defense found in Article 51, which states:

> *Nothing in the present Charter shall impair* the inherent right of individual or collective 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 any time such action as it deems necessary* in order to *maintain or restore* international peace and security.[53]

The express language in Article 51 and its condition precedent of "if an armed attack occurs" would constitute very narrow windows or circumstances where a State can exercise force. This limited view on the use of force would appear to bar any application of "anticipatory self-

(John Carey ed., 1971), reprinted in Levie on the Law of War, 70 Nav War College Int'l L Studies 129, 148 (Michael N. Schmitt & Leslie C. Green eds, 1998).

[51] *Ibid*, art 27, para 3; Oscar Schachter, "United Nations Law in the Gulf Conflict," 85 Am. J. Int'l. L. 452, 454 (1991) [hereinafter Gulf Conflict].

[52] Robert F. Worth, "Saudi Arabia Rejects U.N. Security Council Seat in Protest Move" (18 October 2013), *The New York Times*, online: nytimes.com, <http://www.nytimes.com/2013/10/19/world/middleeast/saudi-arabia-rejects-security-council-seat.html?pagewanted=all&_r=0> (accessed 1 November 2013).

[53] UN Charter, *supra* note 14, art 51 [emphasis added].

defense."[54] However, under existing customary international law,[55] a State can lawfully defend itself in anticipation of an imminent attack, provided two subjective conditions are met:

> A State must determine that the forced used was necessary (there are no other peaceful means to thwart the attack or threat); and the amount of force applied must be proportional to the threat or attack.[56]

Various forums have upheld this interpretation to act preemptively. To begin, the Caroline case is where the discussion of anticipatory self-defense originated.[57] Here the U.S. and British government exchanged a series of letters whereby both affirmed this right to use force before harm could come to their citizens.[58] The U.S. and other States continue this view and conclude that the Charter reserves the customary right of self-defense, as a right which is not only broader but would also include the right of anticipatory self-defense.[59] The International Court of Justice found the

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[54] Ian Brownlie, "The Use of Force in Self-Defence", 1961 Brit YB Int'L L 183, 244 (Article 51 does not permit anticipatory self-defense)[hereinafter Brownlie]; Michael J. Glennon, "The Fog of Law: Self-Defense, Inherence, and Incoherence in Article 51 of the United Nations Charter", 25 Harv JL & Pub Pol'y 539, 547 (2002) (Charter does not permit anticipatory self-defense).

[55] Uri Shoham, "The Grenada Intervention: The Israeli Aerial Raid upon the Iraqi Nuclear Reactor and the Right of Self-Defense," 109 Mil L Rev 191, 198 (1985) (The right of anticipatory self-defense under customary international law is necessary in the era of weapons of mass destruction);

[56] D.W. Bowett, *Self-Defense in International Law* 188-89 (Manchester University Press 1958) [hereinafter Bowett-Self-Defense] ("The right [of self-defense] has, under traditional international law, always been 'anticipatory,' that is to say its exercise was valid against imminent as well as actual attacks and dangers."); Arend & Beck, *supra* note 44, at 72-79; but see Dinstein-War, *supra* note 44, at 87 ("The liberty to venture into war, and generally to employ inter-State force, is obsolete."); Brownlie, *supra* note 54, at 278; see also Oscar Schachter, "The Right of States to Use Armed Force," 82 Mich L Rev 1620, 1633-34 (1984) [hereinafter Armed Force].

[57] Secretary of State Daniel Webster to Mr. Fox, British Minister at Washington, 24 April 1841("*The Caroline case*"), quoted in 2 JOHN BASSETT MOORE, A DIGEST OF INT'L L § 217 (1906); 1 DP O'CONNELL, INT'L L 316 (2d ed 1970)[hereinafter Caroline] (When addressing legal issues of self-defense, courts must discuss the Caroline case).

[58] *Ibid*.

[59] Myres S. McDougal, ed, "The Soviet-Cuban Quarantine and Self-Defense," 57 Am J Int'l L 597, 600 (1963) ("Nothing in the 'plain and natural meaning' of the words of the Charter requires an interpretation that Article 51 restricts the customary right of self-defense…proponents of such an interpretation substitute…words 'if an armed attack occurs'…very different words 'if, and only if, an armed attack occurs.'"); Julius Stone, *Legal Controls of International Conflict* 243-245, 297 (Rinehart & Co. 1954); see also *Military and Paramilitary Activities in and against Nicaragua* (Nicar v US), Jurisdiction and Admissibility, 1986 ICJ 14, at 103, para 195 and at 347-348, para 173 (27 June 1986) [hereinafter Nicaragua Case] (Justice Schwebel dissent : "I do not agree with a construction of the United Nations Charter which would read Article 51 as if it were worded... 'if, and only if, an armed attack occurs...' I do not agree that the terms or intent of Article 51 eliminate the right of self-defense under customary international law, or confine its entire scope to the express terms of Article 51."); Armed Force, *supra* note 56, at 1634, ("It is not clear that Article 51 was intended to eliminate the customary right of self-defense and it should not be given that effect."); Bowett-Self-Defense, *supra* note 56, at 185-92.

existence of the right of self-defense under customary law, but deemed the content and scope of this right to coexist completely with the right of self-defense under Article 51 of the Charter.[60] Anticipatory self-defense as recognized by the international community does not require that a State must endure harm before it is authorized to defend itself from such harm.[61] From the Caroline case above to the touted Bush Doctrine view of customary self-defense, "[the] necessity of self-defense is instant, overwhelming, and leaving no choice of means, and no moment for deliberation."[62]

However, the U.N. Charter's main purpose is to "render the unilateral use of force, even in self-defense, subject to control by the Organization."[63] Article 51 of the U.N. charter requires a State to report its exercise of self-defense to the Security Council,[64] and limits the right of States to act in self-defense "until the Security Council has taken the measures necessary to maintain international peace and security."[65] Thus, it would appear the Council may in theory order by resolution a State to cease military action even if the action was legitimate under self-defense.[66]

However the inverse proposition is not the case. If the Security Council does not provide its sanction or approval to the exercise of self-defense, it does not mean that such action is

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[60] C.H.M. Waldock, "The Regulation of the Use of Force by Individual States in International Law," 81 Recueil des Cours 451, 496-97 (Hague: 1952) ("It would be a misreading of the whole intention of Article 51 to interpret it by mere implication as forbidding self-defense in resistance to an illegal use of force not constituting an 'armed attack.'"); Nicaragua Case, *supra* note 59, Court held that "a mere frontier incident" by an armed patrol into another State's territory would not be characterized as an "armed attack"; see also Timothy L.H. McCormack, *Self-Defense in International Law* 138-139 (St Martin's Press 1996).

[61] Caroline, *supra* note 57.

[62] Gulf Conflict, *supra* note 51, at 459. ("[A] decision…would need the unanimous concurrence of the permanent members…"); Dinstein-War, *supra* note 44, at 188 ("[A} Member State instructed…to refrain from any further use of force…must comply with the Council's directive.")

[63] Brownlie, *supra* note 54, at 273.

[64] Nicaragua Case, *supra* note 59, the ICJ held that because the customary right of self-defense co-exists with the UN Charter, a State's failure report to the Security Council its exercise of self-defense did not breach that State's obligations; however, in the same case, the ICJ held that a State's failure to follow such a requirement was not in line with a justified assertion of self-defense.

[65] UN Charter, *supra* note 14, art. 51

[66] Gulf Conflict, *supra* note 51, at 459 ("[A] decision…would need the unanimous concurrence of the permanent members…"); Dinstein-War, *supra* note 44, at 188 ("[A} Member State instructed…to refrain from any further use of force…must comply with the Council's directive.")

prohibited.[67] All other "necessary measures" ordered by the Security Council to address an armed attack on a State does not guarantee the termination or suspension of the ongoing self-defensive actions.[68] This transition between "jus ad bellum" to "jus contra bellum" was designed to ensure international peace and security.[69] Under Article 2(4) of the U.N. Charter, member States relinquish the right to use force offensively unless such use of armed force is designed to thwart or prevent an attack.[70] The lawfulness of the use of force to counter space-attacks or threats thus turns on whether such space-attacks constitute a use of force that violates Article 2(4) or an "armed-attack" under Article 51 of the U.N. Charter.

Yet, as the International Court of Justice (ICJ) noted in the case of *Nicaragua v. United States*, "a definition of the 'armed attack' which, if found to exist, authorizes the exercise of the 'inherent right' of self-defense, is not provided in the Charter, and is not part of treaty law."[71] The Merriam-Webster dictionary defines "armed" as "furnished with weapons" or "marked by the maintenance of armed [i.e., military] forces."[72] It further defines "attack" as "to set upon or work against forcefully," or "to affect or act on injuriously," or "an offensive action."[73] Under Article 49(1) of Additional Protocol I, "attack" is defined as an act of violence against an adversary. Article 49(2) of Additional Protocol I further explains such an attack may be either a defensive or

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[67] Mary Ellen O'Connell, "Enforcing the Prohibition on the Use of Force: The U.N.'s Response to Iraq's Invasion of Kuwait", 15 S. Ill ULJ 453, 478 (1991). Professor Schachter, in Gulf Conflict, concluded: "It does not make sense to conclude that failure of the Council to endorse action by a state should bar that action when it is otherwise permitted by the Charter and international law. A veto can obviously prevent a Council decision and therefore block the Council from prohibiting action. But a veto of a resolution that would approve or authorize otherwise permissible action cannot have the legal effect of precluding that action." Gulf Conflict, *supra* note 51, at 459 n 23

[68] Gulf Conflict, *supra* note 51, at 458.

[69] Michael E. Howard, "Temperamenta Belli: Can War Be Controlled?," in *Restraints on War: Studies in the Limitation of Armed Conflict* 1, 11 (Michael E. Howard ed, 1979)

[70] Bert V.A. Röling, "The Ban on the Use of Force and the U.N. Charter", in *The Current Legal Regulation of the Use of Force* 1, 3 (Antonio Cassese ed, 1986).

[71] Nicaragua case, *supra* note 59, at 94, para 176.

[72] Merriam-Webster Dictionary, online: Merriam-Webster <http://www.merriam-webster.com/dictionary/armed> (accessed 15 June 2014).

[73] Merriam-Webster Dictionary, online: Merriam-Webster <http://www.merriam-webster.com/dictionary/attack> (accessed 15 June 2014).

an offensive action, regardless of what territory or international space it occurs.[74] The U.S. is a signatory, but has yet to ratify this additional protocol.[75] China, on the other hand, has ratified.[76]

These definitional terms are consistent with the U.N. General Assembly's definition of the term "Aggression."[77] Set forth in Article 3 of Resolution 3314:

> (a) The invasion or attack by the armed forces of a State of the territory of another State, or any military occupation, however temporary, resulting from such invasion or attack, or any annexation by the use of force of the territory of another State or part thereof,
> (b) Bombardment by the armed forces of a State against the territory of another State or the use of any weapons by a State against the territory of another State;
> (c) The blockade of the ports or coasts of a State by the armed forces of another State;
> (d) An attack by the armed forces of a State on the land, sea or air forces, or marine and air fleets of another State;
> (e) The use of armed forces of one State which are within the territory of another State with the agreement of the receiving State, in contravention of the conditions provided for in the agreement or any extension of their presence in such territory beyond the termination of the agreement;
> (f) The action of a State in allowing its temtory, which it has placed at the disposal of another State, to be used by that other State for perpetrating an act of aggression against a third State;
> (g) The sending by or on behalf of a State of armed bands, groups, irregulars or mercenaries, which carry out acts of armed force against another State of such gravity as to amount to the acts listed above, or its substantial involvement therein.[78]

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[74] Additional Protocol I to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflict, 8 June 1977, 1125 UNTS 3, 16 ILM 1391, art 47.
[75] US is a signatory to Additional Protocol I of the Geneva Convention on 12 December 1977, online: International Committee of the Red Cross, <http://www.icrc.org/applic/ihl/ihl.nsf/States.xsp?xp_viewStates=XPages_NORMStatesSign&xp_treatySelected=470> (accessed on 21 July 2014).
[76] China ratified Additional Protocol I of the Geneva Convention on 14 September 1983, online: International Committee of the Red Cross, <http://www.icrc.org/applic/ihl/ihl.nsf/States.xsp?xp_viewStates=XPages_NORMStatesParties&xp_treatySelected=470> (accessed on 21 July 2014).
[77] Definition of aggression, GA Res 3314, UN GAOR, 29th Session, Supp No 31, at 142, UN Doc A/9631 (1975), reprinted in 69 Am J Int'l L 480 (1975) (Adopted without a vote at the 2319th plenary meeting, 14 December 1974) [hereinafter Definition of Aggression]. UN General Assembly through Resolution 3314 (Article 1): "Aggression is the use of armed force by a State against the sovereignty, territorial integrity or political independence of another State, or in any other manner inconsistent with the Charter of the United Nations, as set out in this Definition."
[78] *Ibid*, art 3.

However, this list is not exhaustive as one reads Article 4. An "attack" of any kind on a State's commercial space assets is (1) tantamount with the use of armed force against the sovereignty of another State (to include the use of weapons by a State against another State); (2) not justified as either individual self-defense or collective self-defense;[79] and (3) of sufficient gravity and scope in effect,[80] can be reasonably interpreted as falling within the meaning of Article 51. Thus, targeting of space assets by space weapons (jamming, nuclear burst, kinetic weapon, high-energy particle beam, on-orbit servicing vehicles or a computer virus) generates the same impact whether actual physical force is applied or not. All of these threats have the potential to destroy, degrade, or disable a space asset and/or its functions.

International law has not dictated what type of response must be taken when asserting its right of self-defense; however, it does influence the type of asset and the degree such asset can be employed. These factors and guidance are found within the laws of war: *jus in bello* or law of armed conflict (LOAC).[81] To understand these rules governing warfare (*jus in bello*) and self-defense, one must satisfy certain subjective threshold requirements of necessity and proportionality in response to asserting a defensive action. These basic rules are still subservient to the concept that "the right of belligerents to adopt means of injuring the enemy is not unlimited."[82]

The inherent right of individual self-defense is a State's right justifying the use of force. A State's assertion of self-defense in outer space must also be within the U.N. Charter and customary

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[79] *Ibid*, art 6: Nothing in this Definition shall be construed as in any way enlarging or diminishing the scope of the Charter, including its provisions concerning cases in which the use of force is lawful.
[80] *Ibid*, art 2: The First use of armed force by a State in contravention of the Charter shall constitute prima facie evidence of an act of aggression although the Security Council may, in conformity with the Charter, conclude that a determination that an act of aggression has been committed would not be justified in the light of other relevant circumstances, including the fact that the acts concerned or their consequences are not of sufficient gravity.
[81] William H. Boothby, *The Law of Targeting* (Oxford: University Press, 2012), at 3; Conventional Weapons, *supra* note 34, at 894.
[82] Adam Roberts & Richard Guelff eds. *Documents on the Laws of War,* 3rd ed (Oxford University Press, 2000) at 9.

international law. Political independence and/or protection of territory, citizens and their property have historically been the justification for the use of force. This justification will be part and parcel of the subjective rationale that State's will assert under the U.N. Charter and in their international reporting to satisfy the procedural requirement of "measures taken by members in the exercise of [the] right of self-defense shall be immediately reported to the Security Council."[83] The Article 51 reporting requirement is but one of many factors bearing on the legitimacy of a States' claim to self-defense.[84]

With a broad interpretation of what is allowed (i.e. not otherwise prohibited[85]) under customary international law and the U.N. Charter, the ability to actively use force before any harm can be caused by another State has been gaining a lot of momentum. "Anticipatory self-defense" is the application of force before harm is caused by an "imminent" armed attack. This type of justification is subjective as international law would allow the application of force in self-defense before a State suffers harm from a "first strike", so long as such response is designed to thwart and repel an imminent attack.

This preemptive and anticipatory right was acknowledged in its practical application between the U.S. and United Kingdom in 1837 over the attack on the U.S. Steamer Caroline by the British. This thoughtful exchange laid out the international premise that a State does not have to suffer the harm of an armed attack before taking defensive actions to protect its territory and citizens from harm. However, such assertion may only take place when the factors to exercise one's defense are "instantaneous, overwhelming, and leaving no choice of means and no moment

[83] Dinstein-War, *supra* note 44, at 191.
[84] *Ibid*. Professor Dinstein concluded "[i]nstantaneous transmittal of a report is no guarantee that the [Security] Council will accept that claim. Conversely, the failure to file a report at an early stage should not prove an irremediable defect." *Ibid*; see also Nicaragua case, *supra* note 59.
[85] *S.S. Lotus* (France v Turkey) (1927), PCIJ Ser A, no 10 [hereinafter Lotus Case].

for deliberation."[86] Under the existing laws of war, any use of force or actions in self-defense under the customary right of anticipatory self-defense must also be both subjectively necessary and proportional.[87]

Despite its practical application in history, the assertion behind such use of force remains problematic within the international community because it is a fact-based analysis and wholly based on subjective standards rather than a definitional or internationally accepted or demonstrative criteria. However, the U.S. has implemented its own criteria and circumstances that would warrant such anticipatory actions. This basic core criterion is found within the Chairman of the Joint Chiefs of Staff Standing Rule of Engagement (CJCS SROE). Within this instruction and core U.S. Department of Defense document, the subjective criterion is the analysis and determination of the "hostile intent" of another State or Non-State actor. The DoD defines "hostile intent" as "[t]he threat of imminent use of force against the United States, United States forces, or other designated persons or property."[88] In those circumstances, U.S. commanders are cleared to exercise their right and obligation under self-defense in order to avoid the first use of force by another State or Non-state actor.[89]

This preemptive use of force doctrine was formally expressed in the 2002 National Security Strategy (NSS) where the U.S. Government expanded this use of force doctrine from anticipatory

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[86] Werner Meng, *The Caroline*, in 1 ENCYCLOPEDIA OF PUB INT'L L 537 (Rudolf Bernhardt, 1992 ed) at 538.
[87] INT'L L. COMM'N, *Draft Articles on Responsibility of States for Internationally Wrongful Acts, with commentaries*, UN Doc. A/56/10, *reprinted in* 2001 YB Int'l L Comm'n, vol II, pt 2, UN Doc A/CN.4/SER.A/2001/Add.1 [hereinafter Articles on State Responsibility]. See also James Crawford, ed, *The International Law Commission's Articles on State Responsibility, Introduction, Text and Commentaries* (Cambridge: University Press, 2001).
[88] US, Joint Chiefs of Staff, DEP'T OF DEFENSE DICTIONARY OF MILITARY TERMS 130 (2001) (as amended through 15 February 2014), online: Defense Technical Information Center, <http://www.dtic.mil/doctrine/jel/doddict/> (accessed 30 June 2014) [hereinafter JP 1-02 (2013).
[89] US, Chairman of the Joint Chiefs of Staff, Instruction 3121.01B, *STANDING RULES OF ENGAGEMENT/STANDING RULES FOR THE USE OF FORCE FOR U.S. FORCES*, (13 June 2005) [hereinafter SROE]; JP 1-02, *supra* note 88: "ROEs are directives issued by competent military authority that delineate the circumstances and limitations under which U.S. [naval, ground and air] forces will initiate and/or continue combat engagement with other forces encountered", at 252.

self-defense to preemption under President George W. Bush.[90] Although not hard to imagine, it was again posited in President Bush's revision in 2006 that such offensive applications were authorized against "rogue states and their terrorist clients" which represented active threats to the U.S. and their desire to obtain weapons of mass destruction.[91] Although not expressly listed as such within the 2010 National Security Strategy (NSS), it is important to note that "prevent" occurs 48 times and "deter" occurs 27 times within the NSS under President Barack H. Obama.[92] Under the 2010 NSS, it stated "[t]he space and cyberspace capabilities that power our daily lives and military operations are vulnerable to disruption and attack"[93] and "[i]n addition to facing enemies on traditional battlefields, the United States must now be prepared for asymmetric threats, such as those that target our reliance on space and cyberspace."[94] In 2001, the DoD defined "preemptive attack" as "[a]n attack initiated on the basis of incontrovertible evidence that an enemy attack is imminent"[95] and "preventive war is defined as "a war initiated in the belief that military conflict, while not imminent, is inevitable, and that to delay would involve greater risk."[96] These terms

[90] US, The White House, *The National Security Strategy of the United States of America* (2002).
[91] US, The White House, *The National Security Strategy of the United States of America* (2006). This new preemption doctrine or commonly known "Bush doctrine" attempts to change the definitional meaning of "imminence". In 2006, the US NSS stated, "We must adapt the concept of imminent threat to the capabilities and objectives of today's adversaries" and concluded, "[t]he greater the threat, the greater is the risk of inaction— and the more compelling the case for taking action to defend ourselves, even if uncertainty remains as to the time and place of the enemy's attack." *Ibid*, at 16.
[92] US, The White House, The National Security Strategy of the United States of America (2010) [hereinafter NSS (2010)].
[93] *Ibid*, at 8.
[94] *Ibid*, at 17.
[95] US, Joint Publication 1-02, *DEP'T OF DEFENSE DICTIONARY OF MILITARY TERMS* 428, 432 (2001) (as amended through March 2009) [hereinafter JP 1-02 (2009)], online: Defense Technical Information Center, <http://www.dtic.mil/doctrine/jel/doddict/> (accessed 15 March 2014); see also M. Elaine Bunn, "Preemptive Action: When, How, and to What Effect?," *Strategic Forum*, #200 (2003), at 1-8; Michael Byers, "Preemptive Self-Defense: Hegemony, Equality and Strategies of Legal Change," *Journal of Political Philosophy*, vol 11 (2003), at 171-190; Christopher Greenwood, "International Law and the Pre-emptive Use of Force: Afghanistan, Al-Qaida, and Iraq," *San Diego Int'l LJ*, #4 (2003), at 7–37. Robert S. Litwak, "The New Calculus of Pre-emption," *Survival*, #44 (2002 to 2003), at 53-80; Walter B. Slocombe, "Force, Pre-emption and Legitimacy," *Survival*, #45 (2003), at 117-130; and Gerald Steinberg, "Confusing Ends and Means: The Doctrine of Coercive Pre-emption," *Arms Control Today*, #33 (2003), at 3-5.
[96] JP 1-02 (2009), *supra* note 95.

have changed to "all appropriate actions"[97] and "conflict prevention"[98] reflecting a softer tone without changing a commander's authority to act. Finally, the "Bush Doctrine" in certain aspects has even been expanded under President Obama to allow for the protection of another nation's civilians.[99] This broader interpretation could also be relied upon by other States, to include China.

Professor Michael Schmitt in 2003 outlined when States may legally use force before an actual attack as follows: (1) if the evidence relied upon by the State demonstrates the aggressor has committed itself to an armed attack, and (2) a delayed reaction impedes that State's ability to effectuate a substantial defense.[100] There is a distinction between the "Caroline" Preemptive use of force and the non-imminent preventative use of force in self-defense. The first is legally recognized under international law while the latter may be considered illegal under international law. However, one can argue that the justification for anticipatory self-defense as evolved with the technological advancements in weapons and modern warfare to permit non-imminent, but still preemptive use of self-defense. The failure to act decisively could ultimately preclude acting at all.

There are no restrictions on a State's ability to address natural threats from outer space, especially when such threats could decimate an entire race or even the Earth.[101] The only real restriction on the sources of force in outer space is found in Article IV of the Outer Space Treaty:

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[97] JP 1-02 (2013), *supra* note 88, at 14.
[98] *Ibid,* at 56.
[99] NSS (2010), *supra* note 92, at 22, "Military force, at times, may be necessary to defend our country and allies or to preserve broader peace and security, including by protecting civilians facing a grave humanitarian crisis."
[100] Michael Schmitt, "Preemptive Strategies in International Law," 24 Mich J Int'l L 513, 534 (2003).
[101] *Legality of the Threat or Use of Nuclear Weapons Case,* Advisory Opinion, [1996] ICJ Rep 226 [hereinafter Nuclear Weapons Case]. One could argue, based on the ICJ opinion in the Nuclear Weapons Case, a State could exercise the any measure of defensive options if a State believed such action was "necessary and immediate" to preserve the survival of their State or its citizens. However, two nuclear test treaties ban "any" explosions in outer space (Partial Test Ban Treaty, art IV and Comprehensive Test Ban Treaty, resp art IX). See also Frans von der Dunk (rapporteur), "Legal Aspects Of NEO Threat Response And Related Institutional Issues," (9 February 2010) Final Report, online: Secure World Foundation, <http://www.swfound.org/media/40426/legal_aspects_neo_response_institutional_issues_final_report.pdf> (accessed 28 July 2014). This University of Nebraska study recommends an international legal regime be developed

> 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 weapons on celestial bodies, or station such weapons 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 type 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.[102]

These "sources of force" limitations under Article IV of the Outer Space Treaty do not otherwise prohibit the exercise of self-defense, to include the use of force associated with such right, so long as it does not emanate from nuclear weapons or other weapons of mass destruction place in orbit around the earth or is stationed or installed on a celestial body. Therefore, Weapons of Mass Destruction and Nuclear Weapons can be employed in self-defense as a measure of last resort.[103] In the Steamship *Lotus* case, the Permanent Court of International Justice held that what is not specifically prohibited under this enumeration remains generally permissible in

in order to outline State responsibilities, liabilities and the escalation of force to be applied, to include a nuclear option.

[102] OST, *supra* note 7, art IV. See also, Ricky J. Lee, "The Jus Ad Bellum in Spatialis: The Exact Content and Practical Implications of the Law on the Use of Force in Outer Space", 29 J Space L 93, 107 (2003).

[103] Nuclear Weapons Case, *supra* note 101.

law.[104] Some may argue that these limited restrictions only apply during times of peace.[105] The International Court of Justice (ICJ) observed that "the state of necessity is a ground recognized by customary international law" that "can only be accepted on an exceptional basis" authorizing the application or use of force by one State against another State or non-state actors.[106] The ICJ further concluded that "the state of necessity can only be invoked under certain strictly defined conditions which must be cumulatively satisfied; and the State concerned is not the sole judge of whether those conditions have been met."[107]

CHAPTER TWO: USE OF SPACE UNDER U.S. AND CHINA SPACE POLICY

A. U.S. Space Policy

The use of space by the U.S. dates back to the very first reconnaissance satellite in 1959. Even before there were any international law instruments specifically governing outer space, the U.S. began as one of two world powers that dominated this medium. From the beginning of the U.S.'s involvement in outer space, military uses of space as well as civil, commercial uses of space has been at the forefront of its economic development. With the immense growth of the

[104] Lotus Case, *supra* note 85. However, several legal scholars have not accepted the norms recognized in the Lotus case for various reasons. First, the decision was made by a tie-breaking vote of the President of the Court which reflects the controversial nature of the decision. Second, the United Nations Law of the Sea Convention negated such an interpretation. Finally, such negative obligations (prohibitions were normal before World War II, but there has been a shift after WWII to creating positive obligations of States like those found in the UN Charter and other treaties (including the OST). See Alexander Orakhelashvili, "Natural Law and Customary Law," *Max-Planck-Institut für ausländisches öffentliches Recht und Völkerrecht* (2008), at 84-90; Maurice Mendelson, "The Subjective Element in Customary International Law," 76 Brit YB Int'l L (1995), at 177, 201-202, 204, and 206-207. *Convention on the High Seas*, 450 UNTS 82; *Convention on the Continental Shelf*, 499 UNTS 311; *Convention on the Territorial Sea and Contiguous Zone*, 516 UNTS 205; *Convention on Fishing and Conservation of the Living Resources of the High Seas*, 559 UNTS 285.

[105] Conventional Weapons, *supra* note 34, at 779-880. These authors take the position that the prohibited activities under Article IV of the Outer Space Treaty does not use or reference "attack" and thus these prohibitions within Article IV apply "only to peacetime military activities". *Ibid*.

[106] *The Case Concerning the Gabcikovo-Nagymaros Project (Hungary v Slovakia),* [1997] ICJ Rep 7, 40 [hereinafter Gabčíkovo-Nagymaros Project].

[107] *Ibid*; however, it should be noted that in order to appear before the ICJ, both States must concur to the ICJ's jurisdiction over the matter. In addition, non-state actors are not subject to the ICJ rather perhaps the analysis of which known State which was harboring such non-state actors may be brought before an international tribunal for its knowledge and failure to warn or inaction. See *Corfu Channel Case (UK v Albania),* Merits (1949), ICJ Rep 4 [hereinafter Corfu Channel case]; *Monetary Gold Removed from Rome in 1943 (Italy v France, United Kingdom & United States),* Preliminary Question, (1954), ICJ Rep 32.

space technology, the U.S. is no longer just competing against one nation, but rather multiple nations, such as India and China, in the development and application of space technology.

U.S. Space Policy can dramatically change with period shifts in administrations. The U.S. militarization of outer space began under President Gerald R. Ford and his push for the National Security Decision Memorandum No. 345 (NSDM-345), directing DoD to develop an operational ASAT capability,[108] in response to the then-Soviet Union's weapons development programs. This fear of Soviet weapons development was not relieved by a change in U.S. administration. In 1978, President Jimmy Carter issued a Presidential Directive (PD/NSC-37), which set out his National Space Policy.[109] It included the following among the "basic principles" governing the conduct of the U.S. space program:

> c. Rejection of any claims to sovereignty over outer space or over celestial bodies, or any portion thereof, and rejection of any limitations on the fundamental right to acquire data from space.
> d. The space systems of any nation are national property and have the right of passage through and operations in space without interference. Purposeful interference with operational space systems shall be viewed as an infringement upon sovereign rights.
> e. The United States will pursue activities in space in support of its right of self-defense.[110]

This affirmation of the Outer Space Treaty also included the absolute declaration by the U.S. regarding the right of self-defense in space. Dr. Stares characterized this unclassified version as the means of pragmatically ensuring the duplicity and resiliency within U.S. space systems.[111]

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[108] US, National Security Decision Memorandum No. 345, *U.S. Anti-Satellite Capabilities* (18 January 1977) (NSDM-345 was declassified on 22 June 2004), discussed in Paul B. Stares, *The Militarization of Space: U.S. Policy, 1945-1984* 35 (1985), at 171, 178-79 [hereinafter Stares], online: President Ford's Library, <http://www.fordlibrarymuseum.gov/library/document/0310/nsdm345.pdf> (accessed 20 July 2014).
[109] US, Presidential Directive NSC-37, *National Space Policy* (11 May 1978) at Part 1, online: George C. Marshall Institute, <http://marshall.wpengine.com/wp-content/uploads/2013/09/PD-NSC-37-National-Space-Policy-11-May-1978-1.pdf> (assessed 20 July 2014) [hereinafter PD/NSC-37]. Portions of PD/NSC-37 are still classified.
[110] *Ibid*.
[111] Stares, *supra* note 108.

Since President Ronald Reagan, there have been shifts in thinking and strategy on how to best protect U.S. interests in outer space.[112] In 1981, President Ronald Reagan issued the National Security Decision Directive No. 42 (NSDD 42), issued in 1982 where again, the President of the United States reaffirmed U.S. activities in space will also support U.S. national self-defense.[113] However, with President Reagan there was an additional change, one that would distance the U.S. from cooperation to one of outright deterrence.[114] This policy shift was formalized in a new DoD space policy whereby the development and employment of ASATs emerged as the new dawn of "Space System Protection":

> DoD space systems will be designed, developed and operated to ensure the survivability and endurability of their critical functions at designated levels of conflict. DoD will develop and operate space systems which balance capability and survivability to deter attacks by creating a dilemma for adversary attack planners by responding to these attacks with both space and terrestrial force responses.[115]

This deterrence doctrine continued through President Reagan's two terms until the end of the cold war with the Soviet Union.[116] This downplay of the space program focused more on the space shuttle and less on the development of ASATs. President William J. Clinton in 1996 oversaw this shift to the term "space control", whereby:

> National security space activities shall contribute to U.S. national security by (a) providing support for the United States' inherent right of self-defense and our defense commitments to allies and friends; (b) deterring, warning, and if necessary, defending against enemy attack; (c) assuring that hostile forces cannot prevent our

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[112] US, *Army Space Reference Text*, Chapter 3, online: Federation of American Scientists, <http://www.fas.org/spp/military/docops/army/ref_text/chap3im.htm> (accessed 9 March 2014).
[113] US, National Security Decision Directive No. 42, *National Space Policy* (4 July 1982), online: HQ.NASA.gov, <http://www.hq.nasa.gov/office/pao/History/nsdd-42.html> (accessed 20 July 2014), at 3 [hereinafter NSDD 42].
[114] US, *White House Fact Sheet Outlining United States Space Policy*, 18 Weekly Comp Pres Doc 872 (4 July 1982).
[115] US, Department of Defense Space Policy, Unclassified (10 March 1987), at 5, online: Federation of American Scientists, <http://www.fas.org/spp/military/docops/defense/87memo.htm> (accessed 21 July 2014) [hereinafter DoD Space Policy (1987)]. The official version remains classified.
[116] Michael Krepon, "Lost in Space: The Misguided Drive Toward Anti-Satellite Weapons," 80 Foreign Aff J 2, 4-5 (2001).

> own use of space; (d) countering, if necessary, space systems and services used for hostile purposes; [and] (e) enhancing operations of U.S. and allied forces.[117]

This shift to space control also addressed interference:

> Purposeful interference with U.S. space systems, including their supporting infrastructure, will be considered an infringement of U.S. rights. Such interference, or interference with other space systems upon which the United States relies, is irresponsible in peacetime and may be escalatory during a crisis. The United States will retain the capabilities to respond at the time and place of our choosing.[118]

This "command of space"[119] also translated into protection of commercial and civil assets of the U.S. Another major shift occurred with the 2001 assessment on U.S. space management and how it highlighted U.S. dependence on outer space as well as the vulnerability created by such reliance.[120] The report warned of a "space Pearl Harbor"[121] and had a significant impact on how best to handle space security issues, to include carrying out steps to "deter and defend against hostile acts in and from space".[122] This major shift stood out to the international community in 2006 when President George W. Bush took a more unilateral approach to space superiority and his stance on prioritizing the U.S. perspective to ensure freedom of action by the U.S.[123] This approach also included diversification or dual-use with commercial payloads as

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[117] US, White House Fact Sheet, *National Space Policy* (19 September 1996), online: George C. Marshall Institute, <http://marshall.wpengine.com/wp-content/uploads/2013/09/PDD-NSC-49-PDD-NSTC-8-National-Space-Policy-19-Sep-1996.pdf> (accessed 21 July 2014) [hereinafter US National Space Policy (1996)].
[118] US, Department of Defense Directive 3100.10, *Space Policy*, at 1, para 4(b) (18 October 2012) [hereinafter DoDD 3100.10]. Current DoD policy states that civil and commercial space capabilities are to be used to the maximum extent feasible and practical. *Ibid*, at 4.
[119] For a discussion of the term "command of space", see generally John W. Bellflower, (LL.M), *THE INFLUENCE OF LAW UPON COMMAND OF SPACE* (2009), (McGill University Institute of Air & Space Law)[unpublished]; see also John J. Klein, *Space Warfare: Strategy, Principles and Policy* (New York: Routledge, 2006) at 60.
[120] US, *Report of the Commission to Assess United States National Security Space Management and Organization, Executive Summary*, pursuant to Pub L 106-65, 11 January 2001[hereinafter Rumsfeld Report].
[121] *Ibid* at 8.
[122] *Ibid* at 10.
[123] US, President of the United States, *U.S. National Space Policy,* National Security Presidential Directive 49 (31 August 2006), online: Federation of American Scientists, <http://www.fas.org/irp/offdocs/nspd/space.html> (accessed 8 March 2014).

long as such activities were consistent with U.S. National Security.[124] More specifically, the President Bush's National Space Policy stated "[c]onsistent 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".[125]

With another shift in administrations, the overall message of the National Space Policy may have changed, but it appears to have left all of the tools unchanged within the box of options, especially considering "all appropriate actions" and "variety of measures" are one in the same. The National Space Policy released by the Obama Administration on 28 June 2010, takes a similar but a subjectively less provocative tact concerning the integrity of United States space systems:

> The United States will employ a variety of measures to help assure the use of space for all responsible parties, and, consistent with the inherent right of self-defense, deter others from interference and attack, defend our space systems and contribute to the defense of allied space systems, and, if deterrence fails, defeat efforts to attack them.[126]

Consistent with this principle, the current National Space Policy takes a different approach with regard to new treaties concerning outer space:

> The United States will pursue bilateral and multilateral transparency and confidence building measures to encourage responsible actions in, and the peaceful use of, space. The United States will consider proposals and concepts for arms control measures if they are equitable, effectively verifiable, and enhance the national security of the United States and its allies.[127]

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[124] *Ibid.*
[125] *Ibid.* The provisions of the 2006 US National Space Policy were clear that the US would oppose the development of new legal regimes or other restrictions on outer space that would limit US access to or use of space.
[126] US, President of the United States, *U.S. National Space Policy*, National Security Presidential Directive 49, (28 June 2010) at 7, online: <http://www.whitehouse.gov/sites/default/files/national_space_policy_6-28-10.pdf > (last accessed 21 July 2014) [hereinafter US National Space Policy 2010].
[127] *Ibid*.

In 2012, this change was also reflected in new DoD policy represents that the U.S. construes "capabilities to respond" as any and all appropriate measures authorized under international law and in compliance with U.S. treaty obligations. There can be no doubt that when it comes to exercising the right of self-defense, whether collectively or individually, the U.S. has a long history of doing so and ensuring the preservation of such actions.[128] The protection of U.S. Space assets is an evolving process and varies in application, especially when you consider what options are available to deter attacks or threats to U.S. national security assets.[129]

1. *Dual-Use Technology Policy*

From the dawn of the space program, the U.S. has maintained and utilized a dual-use technology[130] spectrum (i.e., those with both commercial and military applications). The U.S. promotes the development of technology under both avenues, civil/commercial and military. After the collision in 2009 between COSMOS 2251 and a commercial Iridium satellite in orbit creating thousands of pieces of debris,[131] the U.S. began to focus on adapting its capabilities to tackle the operational risks to maintain its global advantage in outer space. Thus in 2010,

[128] Steven C. Welsh, "Preemptive War and International Law" (5 December 2003), online: Center for Defense Information, <http://www.pogo.org/our-work/straus-military-reform-project/conflict/2003/preemptive-war-and-international-law.html> (accessed 8 March 2014). The US Military defines "all appropriate action" as "[a]ction taken in self-defense that is reasonable in intensity, duration, and magnitude, based on all the facts known to the commander at the time." JP 1-02 (2013), *supra* note 88, at 18.

[129] US National Space Policy (1996), *supra* note 117. The United States has long understood the need to defend its access to space. For a more in-depth look at Space Security Politics, see James Clay Moltz, *The Politics of Space Security: Strategic Restraint and the Pursuit of National Interests*, (Stanford: Stanford Security Studies, Stanford University Press, 2008).

[130] The term "dual-use technology" is used to describe the variety of uses and functions associated with the technology involved. Typically, it is defined as technology used by commercial and military applications. Computers, microchips, semiconductors, rocket engines, and telecommunications began with the investment of federal research and development (R&D) funds at the onset assuring their commercial viability today. Fiscal restraints have pushed government to find and secure cheaper ventures of developing technology for the future. The development of technology between the two sectors is vital leveraging funding. The relationship between the two sectors is a "dual-use relationship".

[131] Leonard David, "Effects of Worst Satellite Breakups in History Still Felt Today," 28 January 2013, online: Space Insider <http://www.space.com/19450-space-junk-worst-events-anniversaries.html> (accessed 9 March 2014).

President Barack Obama turned the focus more toward "responsible" behavior and international cooperation while still maintaining President Bush's unilateral approach in securing the right of self-defense and the deterrence of others.[132] A defensive approach can justify the otherwise wrongfulness or unlawfulness use of force and garner the support of the international community.

Further, by diversifying U.S. capabilities and broadening the target spectrum with dual-use assets, the U.S. can remove an enemy's incentive to attack U.S. space assets. By policy, the U.S. is striving to "[d]evelop and implement plans, procedures, techniques, and capabilities necessary to assure critical national security space-enabled missions."[133] This dispersal of space assets means varying the deployment platform, orbital altitudes and planes.[134] Such a policy facilitates system redundancies, but more importantly system resiliency. To further this end, the National Space Policy (2010) is there to "[f]acilitate new market opportunities for US commercial space capabilities and services, including commercially viable terrestrial applications that rely on government-provided space systems."[135]

A good example of U.S. dual-use technology that occurred was Boeing's development of the X-40, which ultimately turned into the new Air Force project X-37B.[136] With the retirement of the shuttle program, Boeing developed and successfully launched the OTV-1 and OTV-2 (aka X-37B), unmanned spacecrafts for the U.S. Air Force.[137] This system contains a shuttle bay

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[132] US National Space Policy (2010), *supra* note 126. See also Chelsea Todaro, "U.S. Military Stepping Up Space Cooperation with Japan, Australia" (18 July 2014), online: National Defense Magazine, <http://www.nationaldefensemagazine.org/blog/Lists/Posts/Post.aspx?ID=1562> (accessed 21 July 2014).
[133] US National Space Policy (2010), *Ibid*.
[134] US, United States Air Force, *Counterspace Operations*, Air Force Doctrine Document 2-2.1 (2 August 2004) at 26 [hereinafter AFDD 2-2.1].
[135] US NSP 2010, *supra* note 126, at 7.
[136] X-40 Space Maneuver Vehicle (SMV) (undated), online: Global Security, <http://www.globalsecurity.org/space/systems/x-40.htm> (accessed 21 July 2014).
[137] Boeing X-37 Orbital Test Vehicle (undated), online: Boeing, <http://www.boeing.com/boeing/defense-space/ic/sis/x37b_otv/x37b_otv.page> (last access on 9 March 2014)

which can be used to redeploy or capture satellites, release or employ space-based weapons, or perform earth observation or critical telecommunication functions with a turn-around time of 10-15 days or less.[138] Although this program has been classified since 2004 when National Aeronautics and Space Administration (NASA) transferred the project to Defense Advanced Research Projects Agency (DARPA), there are still articles that speculate as to its real functions and purposes in outer space. The key here is that the blend of flying-drone technology that has been heavily used by the U.S. is now working its way into and out of space. The capability of this dual-use technology to loiter in space and perform on demand mission requirements has been dramatically extended. The X-37B and its various OTV versions are shattering the on-orbit records held by the space shuttle. The expanded mission parameters for the X-37B open the door for multiple applications far and above those offered by the former National Space Transport System (i.e. Space Shuttle program). Further, the development and deployment of one of the Air Force's newest spacecraft has enabled the U.S. to utilize this particular space asset for civil, commercial, and military uses depending on the functions this particular spacecraft is performing during the duration of its mission.

2. *Militarization Policy*

Currently the focus is on a cooperative approach to ensure space stability to enable "[o]ptions for mission assurance may include rapid restoration of space assets and leveraging allied, foreign, and/or commercial space and non-space capabilities to help perform the mission."[139] Maintaining international partnerships and relations, especially with the European Union (France in particular) and Japan, provide others avenues to replace and redeploy critical

[138] John Antczak, "X-37B returns to Earth after 7-month mission" (3 December 2010), *The Associated Press*, online: Air Force Times, <http://www.airforcetimes.com/article/20101203/NEWS/12030304/X-37B-returns-Earth-after-7-month-mission> (accessed 18 September 2013).
[139] US National Space Policy (2010), *supra* note 126.

defense assets. Finally, energizing the commercial sector to provide such launch and restoration services allows the DoD to have greater capacity and capability to move ahead of an adversary.

Further, the U.S. Secretary of Defense is directed by the National Space Policy (2010) to "[d]evelop capabilities, plans, and options to deter, defend against, and, if necessary, defeat efforts to interfere with or attack U.S. or allied space systems."[140] Thus, U.S. DoD policy is focused on creating more forms of current State practice through its actions and international partnerships.[141] However, this new focus does not in any way limit the ability to apply both defensive and offensive measures in outer space.[142] U.S. Air Force Doctrine (AFDD) 2-2, Space Operations, defines both offensive and defensive counterspace operations:[143]

> Offensive counterspace operations destroy or neutralize an adversary's space systems or the information they provide at a time and place of our choosing through attacks on the space, terrestrial, or link elements of space systems . . . Defensive counterspace operations consist of active and passive actions to protect US space-related capabilities from enemy attack or interference.[144]

With regard to military operations, when the use of force is involved, commanders and operators must have appropriate levels of human intervention (various levels of approval) prior to the employment of force.[145] Commanders and operators are specifically authorized to execute active defensive measures such as the Suppression of Adversary Counterspace Capabilities (SACC). SACC either neutralize or negate the offensive counterspace systems of adversaries by means of

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[140] *Ibid*.
[141] US, The White House, "Trustworthy Cyberspace: Strategic Plan for the Federal Cybersecurity Research and Development Program", *Office of Science Technology and Policy* (December 2011). See also DoDD 3100.10, *supra* note 118; AFDD 2-2.1, *supra* note 134; US, United States Air Force, *Space Operations*, Air Force Doctrine Document 2-2 (27 November 2006) at 1[hereinafter AFDD 2-2].
[142] US National Space Policy (2010), *supra* note 126.
[143] AFDD 2-2, *supra* note 141, at 8-11.
[144] *Ibid*.
[145] US, Department of Defense Directive 3000.09, *Autonomy in Weapon Systems*, 21 November 2012, online: Defense Technical Information Center <http://www.dtic.mil/whs/directives/corres/pdf/300009p.pdf> (accessed 9 March 2014).

"deception, denial, disruption, degradation, and/or destruction."[146] These types of military operations target air, land, sea, space, special operations, or information operations in a preemptive strike or self-defense posture.

On 13 October 2013, DARPA awarded a contract for the Phoenix program, a concept being designed and developed to "cooperatively harvest and re-use valuable components from retired, nonworking satellites in GEO and demonstrate the ability to create new space systems at greatly reduced cost."[147]

Phoenix's Phase 2 efforts plan to focus on developing technologies in three primary technical areas of research[148]:

Advanced GEO space robotics:

> DARPA is developing a variety of robotics technologies to address key on-orbit mission needs, including assembly, repair, asset life extension, refueling, etc., in the harsh environment of geosynchronous orbit. Development activities include the maturation of robotic arms and multiple generic and mission-specific tools. These technologies would be part of a future robotic assembly platform, the Servicer/Tender.[149]

Spacecraft Morphology (Satlets):

> A new low-cost, modular satellite architecture that can scale almost infinitely. Satlets are small independent modules (roughly 15 pounds/7 kg) that incorporate essential satellite functionality

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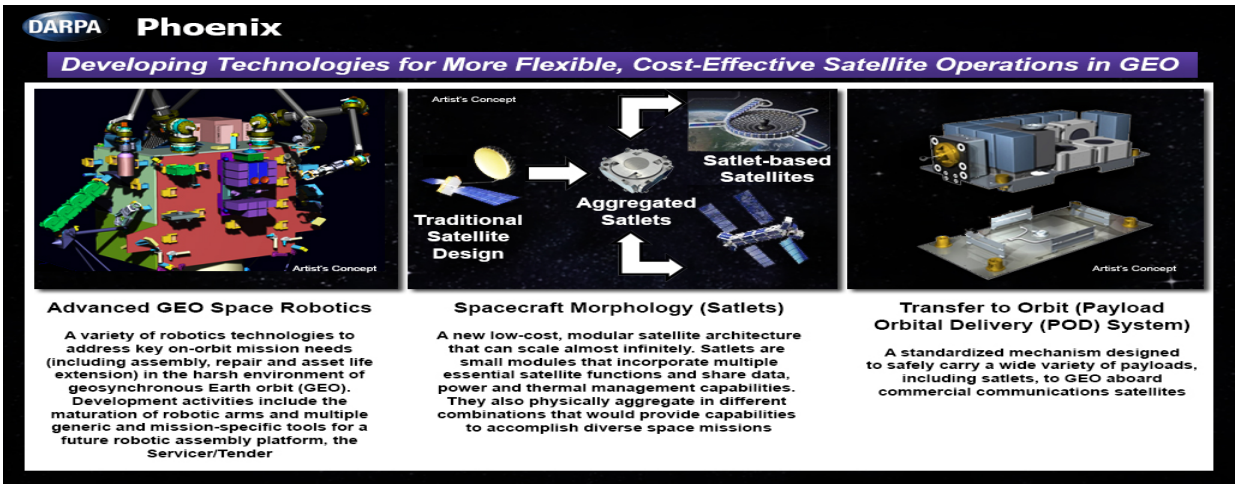
[146] AFDD 2-2.1, *supra* note 134 at 27.
[147] US, Phoenix Program (undated), online: Defense Advanced Research Projects Agency, <http://www.darpa.mil/Our_Work/TTO/Programs/Phoenix.aspx> (last accessed on 9 March 2014). See also DARPA Government Contract Award Notice (13 October 2013), online: Federal Business Opportunities <https://www.fbo.gov/index?s=opportunity&mode=form&tab=core&id=de4f0fd5e637e51358e5455b84d9c52b&_c view=0> (last accessed on 9 March 2014). There are three contract awards with various contract terms and option contract extensions. On 20 June 2012, the first contract award went to NovaWurks, Inc. at $ $2,859,852. On 12 July 2012, another contract was awarded to MacDonald, Dettwiler and Associates, Inc. with the base cost at $1,940,478 and an option for $2,190,758. On 8 October 2013, a third contract was awarded to NovaWurks, Inc. with the contract base value at $30,756,936, with a first option contract extension at $1,305,299, a second option contract at $7,272,953, a third contract option at $467,433, and a fourth option contract at $2,825,093. The total base award is $35,557,266. The options years total $14,061,536. The grand total is $49,618,802. *Ibid*.
[148] Phoenix Makes Strides in Orbital Robotics and Satellite Architecture Research, 2 April 2014, online: Defense Advanced Research Projects Agency, <http://www.darpa.mil/NewsEvents/Releases/2014/04/02a.aspx > (accessed 21 July 2014) [hereinafter Phoenix Orbital Robotics].
[149] *Ibid*.

(power supplies, movement controls, sensors, etc.). Satlets share data, power and thermal management capabilities. Satlets also physically aggregate (attach together) in different combinations that would provide capabilities to accomplish a range of diverse space missions with any type, size or shape payload. Because they are modular, they can be produced on an assembly line at low cost and integrated very quickly with different payloads. DARPA is presently focused on validating the technical concept of satlets in LEO.[150]

Payload Orbital Delivery (POD) system:

The POD would be a standardized mechanism designed to safely carry a wide variety of separable mass elements to orbit—including payloads, satlets and electronics—aboard commercial communications satellites. This approach would take advantage of the tempo and "hosted payload" services that commercial satellites now provide while enabling lower-cost delivery to GEO. DARPA is also pursuing a possible risk-reduction flight to validate the POD technology, which could eventually provide "'FedEx®' to GEO" capabilities to make future space deliveries to high orbit much easier and faster.[151]

Figure 1: DARPA Phoenix
http://www.darpa.mil/uploadedImages/Content/NewsEvents/Releases/2014/Phoenix_Landing_Page_DRAFT6.jpg



Mr. David Barnhart, the DARPA project manager stated:

Individually or together, these technologies could help enable not just Phoenix's original concept of re-use, but a broad class of other robotically enabled missions at GEO as well…They could help

[150] *Ibid.*
[151] *Ibid.*

> satellites reach new or proper orbits, inspect satellites as part of routine maintenance or troubleshooting efforts, repair or replace worn-out components, or add or upgrade capabilities…These capabilities would enable space systems, for the first time, to have the flexibility, accessibility and resilience that designers of terrestrial systems take for granted.[152]

Today, DARPA is also requesting projects called Space Enabled Effects for Military Engagements (SeeMe).[153] The focus here is remote, on-demand satellite or communications packages at the tactical warfighter level. DARPA's SeeMe program has the capability to provide small tactically deployed squads and/or specialized teams with access to small satellite functionality, earth observation imagery or telecommunications, at the push of a button and at a fraction of launching a larger service provider. This project seeks to employ "tiny disposable" space assets to aid these tactical units at their precise location within 90 minutes.[154] DARPA wants to provide extended coverage support without the need of frequent refueling and at a lower cost than aerial drone assets currently being used. DARPA would employ a constellation consisting of approximately 24 "tiny" satellites with a short life span (60-90 days) in very low earth orbit.[155] This LEO placement is designed to facilitate deployment as well as mitigate any space debris hazard as these tiny satellites would evaporate during re-entry.[156] To maintain the rapid deployment capability of the project, SeeMe would employ DARPA's Airborne Launch Assist Space Access (ALASA) program, an aircraft-based space asset launch medium for payloads weighing around 100 lbs. This low-cost, rapid launch medium can place space assets into "any required orbit, a capability not possible today from fixed ground launch sites."[157] This

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[152] *Ibid*.
[153] Space Enabled Effects for Military Engagements (undated), online: Defense Advanced Research Projects Agency, <http://www.darpa.mil/Our_Work/TTO/Programs/Space_Enabled_Effects_for_Military_Engagements_(SeeMe).aspx > (accessed 30 September 2013) [hereinafter SeeMe].
[154] *Ibid.*
[155] *Ibid*.
[156] *Ibid*.
[157] *Ibid*. See also DARPA Contracts awarded on 20 February 2013 and 27 November 2012, online: Federal Business Opportunities,

program also aligns with another proposal being considered by the U.S. Air Force on disaggregation.[158] The proliferation of small or tiny cube satellites will provide resiliency and fresh technology in shorter time windows and even to remote areas of the world where other orbital planes are currently not being used. These capabilities have tremendous commercial application, which could be appealing to other non-space faring nations as their low-cost gateway into space. As the technology and launch costs decrease with smaller satellites, other space faring nations will be able to employ and replace space technology to suit their individual needs and with greater coverage.

3. *National View on Peaceful Use of Outer Space*

The U.S. position on the "peaceful use of outer space" has been that such use is non-aggressive, but includes military use of outer space for defensive purposes. However, when it comes to justifying self-defense or use of force, the U.S. position is the same as it is in every other medium, there is an inherent right of self-defense, including anticipatory self-defense. Allowing military uses of outer space has been a consistent State practice of the United States from the inception of the space age to even today.[159] This reality began with the practical availability of earth-observation satellites utilized for military reconnaissance.[160] This practical

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<https://www.fbo.gov/index?s=opportunity&mode=form&tab=core&id=44426f9c722e867e6e7b860f53873f41&_cview=0> (accessed 30 September 2013).

[158] Zachary T. Eytalis, "Disaggregation of Military Space Applications: Law and Policy Considerations" (13 May 2014), presented at the *2nd Manfred Lachs International Conference on Global Space Governance* on 30 May 2014.

[159] Bin Cheng, *Definitional Issues in Space Law: the "Peaceful Use" of Outer Space, including the Moon and other Celestial Bodies* (Adapted from the paper "The Legal Status of Outer Space and Relevant Issues: Delimitation of Outer Space and Definitions of Peaceful Use," 11 J Space L 89 (1983))[hereinafter Cheng-Peaceful Use]; Bin Cheng, "The Commercial Development of Space: the Need for New Treaties" (Adapted from a keynote address delivered at a seminar on *The Cape York Space Port: The Legal and Business Issues*, 17 August 1990), 19 J Space L 17 (1991), reprinted in *Studies in International Space Law* 641, 651 (Clarendon Press 1997) [hereinafter Cheng-Studies in Space Law], at 513, 515; see also Richard A. Morgan, "Military Use of Commercial Communication Satellites: A New Look at the Outer Space Treaty and 'Peaceful Purposes,'" 60 J Air L & Comm 237, 303, 304 n 353-55 [hereinafter Morgan].

[160] National Security Council, *Preliminary U.S. Policy in Outer Space* (NSC 5814/1) (20 June 1958), reprinted in *Organizing for Exploration, Nat'l Security Council*, NSC 5520, Draft Statement of Policy on US Scientific Satellite Program (20 May 1955), reprinted in 1 Exploring the Unknown: Selected Documents in the History of the US Civil Space Program (John M. Logsdon ed, 1998); quoted in Stares, *supra* note 108, at 55; see also Stares, at 40 ("As

distinction was echoed in U.S. Space Act of 1958[161] and during the U.S. negotiations and international statements to support its own national defense and the legality behind its operational use of outer space to gather intelligence.[162] This definitional use of outer space is key to U.S. space policy and has almost been universally adopted interpretation that "peaceful" means "non-aggressive". This distinction is consistent with the U.N. Charter.[163] The U.S. has announced to the international community that it has an underlying "peaceful use" policy, with the caveat that space assets have the ability to use any and all appropriate measures within the medium of outer space in self-defense.[164] To this end, no State has formally challenged the U.S. version of "peaceful" in relation to current outer space activities.[165] It appears that today a consensus has developed where "peaceful" within the Outer Space Treaty, equates more so to the "non-aggressive" interpretation.[166] In practice, this view has led to an understanding among the major space actors that all military activities in outer space are generally permissible, unless specifically prohibited by treaty or customary international law.[167]

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early as 1958-59, the legal position of the United States with respect to the meaning of the phrase 'peaceful uses' became crystallized along lines quite dissimilar from the initial rhetoric."); David N. Spires, *Beyond Horizons: A Half Century of Air Force Space Leadership* 139, n 8 (rev ed 1998), at 38-40.

[161] National Aeronautics and Space Act of 1958, Pub L No 85-568, 72 Stat 426 (1958) (unamended) (codified as amended at 42 USC 2451 et seq (2000)).

[162] Ivan A. Vlasic, "The Legal Aspects of Peaceful and Nonpeaceful Uses of Outer Space" in Bhupendra Jasani ed, *Peaceful and Non-Peaceful Uses of Space, Problems for the Prevention of an Arms Race* (The Netherlands, Kluwer, 1991), at 37 [hereinafter Peaceful Uses of Space]; see also Bhupendra Jasani, "Introduction in Peaceful Uses of Space," *Ibid*, at 7.

[163] Morgan, *supra* note 159, at 305.

[164] Paul G. Dembling & Daniel M. Arons, "The Evolution of the Outer Space Treaty", 33 J Air L & Comm 419, 434 (1967). Dembling opined: "In the interim, one might conclude that any military use of outer space must be restricted to nonaggressive purposes in view of Article III, which makes applicable international law including the Charter of the United Nations". However, in Cheng-Studies in Space Law, *supra* note 159, at 651-52, Bin Cheng opines that such opinion is an "erroneous belief that the restriction of the use for 'exclusively peaceful purposes'... extends to the whole of outer space."

[165]Cheng-Studies in Space Law, *supra* note 159, at 408, 522; Peaceful Uses of Space, *supra* note 162, at 45.

[166] Bruce A. Hurwitz, *The Legality of Space Militarization*. (Amsterdam: North-Holland, 1986) at 58, n 20; Eilene Galloway, "International Institutions to Ensure Peaceful Uses of Outer Space," vol IX, Ann Air & Sp L 310 (1984); Morgan, *supra* note 159, at 303; Carl Q. Christol, *Space Law: Past, Present, and Future* (New York: Springer, 1991) at 16.

[167] William A. Hill (Major, USAF), "Permissible Scope of Military Activity in Outer Space," 24 AFL Rev 157, 174 (1984).

"If you know the enemy and know yourself, you need not fear the outcome of a hundred battles."[168] - Sun Tzu, The Art of War

B. China Space Policy

The People's Republic of China (China) is a country of approximately 1.4 Billion people.[169] From its first president Mao Zedong to its current leader Xi Jinping, China's development of launch vehicles and its increased spending on military budgets are central to the control over its populace and have facilitated the passage of power to the next leader of the China. China has been engaged in space-related technology since 790 A.D. with its first rocket.[170] However, since the first Gulf War, China (People's Liberation Army (PLA)) defense strategy is described as "limited war under high-technology conditions"[171] as they realized the value of integrating their terrestrial and outer space systems. China's development over the last 10 years has been remarkable as they have advanced from a developing space program to being considered a threat to the U.S. military. China, like all States, depends on the progress of science and technology to make advances in outer space. China became the third country in the world to launch a human into space in 2003[172] to becoming the third nation to successfully test an Anti-Satellite weapon in 2007.[173] Fortunately for China, the fall of the Soviet Union fostered a new partnership where China used its monetary capital to gain an open exchange of technology and

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[168] Sun Tzu, *supra* note 6.
[169] Population of China (2014), online: World Population Statistics, <http://www.worldpopulationstatistics.com/population-of-china-2014/> (accessed 18 July 2014).
[170] Brian Harvey, *CHINA'S SPACE PROGRAM: From Conception to Manned Spaceflight*, (Springer Praxis Publishing: Chichester, UK 2004), at 323 [hereinafter Harvey-China].
[171] David Shambaugh, 1996a, "China's Military in Transition: Politics, Professionalism, Procurement and Power Projection", China Quarterly, no 146 (June 1996a), at 280, cited in Denny Roy, *China's Foreign Relations*, (Rowman & Littlefield Publishers, Inc, Mass 1996) at 125.
[172] David Chandler and Emma Young, "First Chinese astronaut blasts off" (15 October 2003), New Scientist, online: New Scientist, < http://www.newscientist.com/article/dn4275-first-chinese-astronaut-blasts-off.html#.U91g3dxdWSp> (accessed 15 March 2014).
[173] William J. Broad and David E. Sanger, "China Tests Anti-Satellite Weapon, Unnerving U.S." (18 January 2007), *The New York Times*, online: NY times < http://www.nytimes.com/2007/01/18/world/asia/18cnd-china.html> (accessed 15 March 2014) [2007 Chinese ASAT Test]. This is China exercising an "active defense" strategy. See B. Shixiu, "Deterrence Revisited: Outer Space", *China Security*, 2-10 (2007).

scientists from a wounded Russian Federation in need of monetary capital.[174] China also reengaged their diplomatic contact with the Russian Federation and accelerated its focus on space in 1993.[175]

It is difficult to ascertain whether China's space policy is peaceful or heading towards a more aggressive and/or offensive purpose. The Chinese government, like the U.S., maintains tight control over information and its dissemination. However, there appears to be fundamental differences and disconnects between what the military intends to do in outer space versus the official Chinese diplomatic statements in discussions regarding the weaponization or militarization of outer space.[176] China's space program advancements have outpaced other nations breaking the space superpowers into more than 2 States. China's fast paced advancement into outer space exploration over the last 10 years and the international politics around such development, unfortunately, has left both the U.S. and China in a position of distrust fostered by fear.

In March of 2011, China published a white paper on its national defense, called China's National Defense in 2010.[177] This white paper emphasizes China's position on defending its territory and any matter related to its national defense. Within chapter X titled "Arms Control

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[174] US, Office of the Secretary of Defense, *Annual Report to Congress: Annual Report on the Military Power of the People's Republic of China* (Washington, DC: US Department of Defense, 2004), at 32 [hereinafter 2004 Annual Report]. See also US, Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2013* (Washington, DC: US Department of Defense, 2013), at 46-48 [hereinafter 2013 Annual Report]

[175] Harvey-China, *supra* note 168, at 328. This resource is on point in describing the evolution of China's space program up to the point of manned space flight in 2003 and is a another resource for websites containing additional information on China's space program.

[176] Assessing Chinese Intentions, *supra* note 29. Maj Oh provides a distinct overview of several experts on China's military strategies as well as the methodology behind it. China is secretive about any space militarization program while proclaiming to the international community that they view the development of outer space as non-military. There is disparity between China's military statements to develop more weapons in outer space versus China's COPUOS statements on PPWT and statements of strictly non-military use of outer space.

[177] Xinhuanet, "Full text: China's National Defense in 2010", 31 March 2011, online: Nuclear Threat Initiative, <http://www.nti.org/media/pdfs/1_1a.pdf?_=1316627912> (accessed 15 March 2014) [hereinafter China Defense 2010]. All of China's white papers are also available at http://english.gov.cn/official/2005-08/17/content_24165.htm.

and Disarmament", China outlines its stance on weaponization and the prevention of an arms race in space. Chapter X states:

> The Chinese government has advocated from the outset the peaceful use of outer space, and opposes any weaponization of outer space and any arms race in outer space. China believes that the best way for the international community to prevent any weaponization of or arms race in outer space is to negotiate and conclude a relevant international legally binding instrument.
>
> In February 2008, China and Russia jointly submitted to the Conference on Disarmament (CD) a draft Treaty on the Prevention of the Placement of Weapons in Outer Space and the Threat or Use of Force against Outer Space Objects (PPWT).[178] In August 2009, China and Russia jointly submitted their working paper responding to the questions and comments raised by the CD members on the draft treaty. China is looking forward to starting negotiations on the draft treaty at the earliest possible date, in order to conclude a new outer space treaty.[179]

Despite the PPWT being rejected in 2008, it did raise critical discussions within the international community, and ultimately the European Hague Code of Conduct.[180] With the 2007 ASAT test by China[181], it is questionable how serious China wants to truly eliminate the effects of space weapons in outer space as the PPWT lacks any means of verification and would not prevent the development of terrestrial-based space weapons causing destruction and debris within the space

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[178] China and Russia, Conference on Disarmament, *Draft Treaty on the Prevention of the Placement of Weapons in Outer Space and the Threat or Use of Force against Outer Space Objects*, 29 February 2008, online: Conference on Disarmament Documents related to Prevention of an Arms Race in Outer Space, < http://daccess-dds-ny.un.org/doc/UNDOC/GEN/G08/604/02/PDF/G0860402.pdf?OpenElement> (accessed 3 November 2013) [hereinafter PPWT].

[179] China Defense 2010, *supra* note 177.

[180] Hague Code of Conduct (HCOC), 30 November 2012, online: HCOC.AT, <http://www.hcoc.at/?tab=background_documents&page=text_of_the_hcoc> (accessed 30 October 2013).

[181] Gregory Kulacki, "Anti-Satellite (ASAT) Technology in Chinese Open-Source Publications" (1 July 2009), in Global Security Program, online: Union of Concerned Scientists, <http://www.ucsusa.org/assets/documents/nwgs/Kulacki-Chinese-ASAT-Literature-6-10-09.pdf> (accessed 15 October 2013) [hereinafter Kulacki]. However, the actual military advantage may be limited. See M.J. Dillion, *Implications of the Chinese ASAT Test for the US Navy* (Master's Thesis, Naval Postgraduate School, 2008)[unpublished], *online*: Defense Technical Information Center, <http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA488669> (accessed 20 November 2013).

environment. In China's 2011 White Paper, it again declared that the purposes of China's space industry are:

> [T]o explore outer space and to enhance understanding of the Earth and the cosmos; *to utilize outer space for peaceful purposes*, promote human civilization and social progress, and *to benefit the whole of mankind*; to meet the demands of economic development, scientific and technological development, *national security* and social progress; and to improve the scientific and cultural knowledge of the Chinese people*, protect China's national rights and interests, and build up its national comprehensive strength*.[182]

Much like the U.S., China's national protection and security are balanced against peaceful purposes as both are weaved into China's space policy as a positive measure of domestic prestige and prominence (*protect China's rights and interests…build up its…strength*) among the international community (*to benefit the whole of mankind*). This sentiment is echoed within the Sino-Russian Joint Statement signed on 20 May 2014;[183] China needs Russian cooperation in high-tech fields (manned spaceflight, earth observation, satellite navigation, deep space exploration and space-based technology research).[184] This agreement highlights how China wants a space partner as the U.S. has not included China in U.S. space activities. China is also focused on its space security:

> Our current information and communication technologies are used with the purpose of maintaining international stability and security, contrary to harm national sovereignty and personal privacy behavior expressed serious concern. We believe that the international community should respect each other in international cooperation on the basis of equality and mutual benefit, common response to information security threats. Called on the international community to develop generally accepted code of conduct, uphold

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[182] China, White Paper, "China's Space Activities in 2011" (29 December 2011), online: China News, <http://www.china.org.cn/government/whitepaper/node_7145648.htm> (accessed 18 September 2013) [hereinafter China Space Activities (2011)] [emphasis added].
[183] China and Russia, "People's Republic of China and the Russian Federation Joint Declaration on a new stage of comprehensive strategic partnership of cooperation" (20 May 2014), in *China News Network* by Wang Shanshan, ed, online: China News<http://www.chinanews.com/gn/2014/05-20/6192687.shtml> (accessed 4 August 2014) [unofficial translation].
[184] *Ibid*.

> multilateralism, democracy, the principle of transparency, so that the internationalization of Internet governance system, building peace, security, openness and information environment of cooperation.[185]

Despite these open statements by China, the world, in general and the U.S. in particular, should be concerned with China's space development as well as their intention to utilize space to gain an advantage, both economically and militarily.

1. *Dual-Use Technology Policy*

China also had a fundamental shift in policy after 2001 from non-military to military with non-military technology. To date, their diplomatic position has been focused on the non-military use of outer space. However on 5 May 2011, Mark Stokes (Lt. Col., USAF Retired) testified before Congress to explain what drives China's Space program, which he characterized as both civilian and military and appears to mimic U.S. space policy on utilizing dual-use, civil-military space programs:

> The PRC has embarked upon an ambitious dual-use, civil-military space program that is predominantly driven by the desire to stand among equals in the international community. However…there is a military stake…a political perspective, Beijing seeks to elevate its status and prestige internationally…an economic perspective, China benefits from space technology spin-offs, commercial applications of space systems, and revenue generated by international satellite launch services…the People's Liberation Army (PLA) plays a prominent if not central role…Control over the skies…is a critical enabler for dominance…denying a potential adversary's effective use of space assets, offers…greater flexibility…and greater confidence in its nuclear deterren[ce]…deter attacks on Chinese space systems, or complicate the ability of regional powers to operate….[186]

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[185] *Ibid*. However, this joint statement also stated, "The two sides agreed that the regional issues should be resolved by force, all the problems should be resolved through negotiations." Perhaps Russia's statement on exercising restraint in the Ukraine might shed light that both States agree that regional issues are a threat to their own national security, as Russia has not exercised restraint in its involvement in the Ukraine. See Steven Norton, "Conflict Over Russia's Role in Ukraine Spills Into Tech Sector" (22 July 2014), in The Wall Street Journal, online: Wall Street CIO Journal Blog, <http://blogs.wsj.com/cio/2014/07/22/conflict-over-russias-role-in-ukraine-spills-into-tech-sector/> (assessed 4 August 2014).

[186] US, Hearing before The US-China Economic and Security Review Commission, *THE IMPLICATIONS OF CHINA'S MILITARY AND CIVIL SPACE PROGRAM*, 11 May 2011, 112th Congress, online: U.S.-China Economic and Security Review Commission,

China's shift of focus included technology acquisition, either through internal development or by purchase, of dual-use technologies to be utilized by the People's Liberation Army (PLA) in China's development of weapons, not just those designated for use in outer space. China's preferred avenue, according to Lt Col Stokes, is via "foreign technology purchases, acquisition of Western companies, and cooperative technology transfers as part of commercial activities."[187] China's competitive growth in space technology has outpaced that of the U.S.[188]

China's practices of acquiring U.S. technology are outlined in the 2011 report of the U.S. China Economic and Security Review Commission where China's espionage tactics are described as the "single greatest risk to the security of American technologies."[189] According to same 2011 U.S. report it accounts for U.S. sales of technology to China:

> One distinctive feature of Chinese technology acquisition is the autonomy given to research institutes, corporations, and other entities to devise collection schemes according to their particular needs. These operations, which often involve surreptitious means of obtaining information, occur outside the direct supervision of the state's intelligence apparatus… Another method of acquiring foreign technology… involves collecting information from scholarly literature and other open sources in the West."[190]

This trend has continued since 2006 where China's acquisition of U.S. technology exports increased by 44% totaling $17.7 billion in revenue.[191] Furthermore, China's increasing

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<http://origin.www.uscc.gov/sites/default/files/transcripts/05.11.11HearingTranscript.pdf> (accessed 18 September 2013), at 42.

[187] Dallas Boyd, et al, "Advanced Technology Acquisition Strategy of the People's Republic of China," *Defense Threat Reduction Agency*, Report Number: ASCO 2010 021 (September 2010), at 12.

[188] Futron Corporation, *Space Competitiveness Index, Executive Summary* (2012), online: Futron Corporation, <http://www.futron.com/upload/wysiwyg/Resources/Reports/Futron_2012_Space_Competitiveness_Index_Executive_Summary.pdf> (accessed on 21 July 2014). This study looked at fifteen spacefaring nations and it reported that China was the only State to show competitive growth over that last 5 years. The U.S. was still ranked highest, but the study shows how the U.S. is gradually losing it global competitiveness in the area of space technology.

[189] Christopher Stone, "US cooperation with China in space: Some thoughts to consider for space advocates and policy makers" (25 February 2013), citing *Report on Chinese Advanced Technologies Acquisition Strategies* 2011, online: TheSpaceReview.com, <http://www.thespacereview.com/article/2246/1> (accessed 21 July 2014).

[190] *Ibid*.

[191] Adam Segal, "New China Worries, The Chinese military is snapping up the latest in cutting-edge Western technology. Is that good?" (Fall 2007), *The International Economy Magazine*, Fall 2007 Issue, 70-85, at 71, online:

application of dual-use technologies has provided significant cost savings and cross-over benefits to their defense-industrial sector.[192]

In a 2012 Review Commission Staff Research Report on *Indigenous Weapons Development in China's Military Modernization for Military & National Security Affair*s,[193] Amy Chang recounts China's advancement in the space technology development. Ms. Chang continually states "China's selective transparency" is the disparity between private and governmental analysis of Chinese space weapon technology. This outward political front on commercial development and focus on obtaining dual-use technology has facilitated significant advancements for the Chinese military (PLA).[194] Although such a report might be considered a bias source, it does reflect the confusion between China's official positions and how the U.S. may view China's space activities.

From 2005 to 2009, Lieutenant General (Lt Gen) Michael Maples was the director of the Defense Intelligence Agency (DIA).[195] He testified before the U.S. Congress about China's weapons development programs. In 2009, he proffered his opinion that China's development of weapons that will target "U.S. space-based navigation, communication, and intelligence collection capabilities."[196] Lt Gen Michael Maples also indicated China's dual-use of civilian

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Council on Foreign Relations, <http://www.cfr.org/content/publications/attachments/TIE_F07_Segal.pdf> (accessed 19 July 2014).

[192] Amy Chang, "Indigenous Weapons Development in China's Military Modernization" (5 April 2012), in U.S.-China Economic and Security Review Commission Staff Research Report, online: <http://origin.www.uscc.gov/sites/default/files/Research/China-Indigenous-Military-Developments-Final-Draft-03-April2012.pdf> (accessed 15 March 2014).

[193] *Ibid*.

[194] See generally, *supra* note 192.

[195] Lieutenant General (Lt Gen) Michael Maples biography at DIA (undated), online: Defense Intelligence Agency, <http://www.dia.mil/About/Leadership/ArticleView/tabid/3982/Article/7132/ltg-michael-d-maples-usa.aspx> (accessed 15 March 2014). Lt Gen Maples retired in 2009.

[196] US, Senate Armed Services Committee, 111th Cong, *Hearing on Current and Future Worldwide Threats to the National Security of the United States*, (Washington, DC: 1st session, 10 March 2009), online: US Senate, <http://www.senate.gov/~armed_services/Webcasts/2009/March/03-10-09Webcast.htm> and <http://www.dni.gov/files/documents/Newsroom/Testimonies/20090310_testimony.pdf> (accessed 15 March 2014).

aerospace technologies to improve "its ability to track and identify satellites…a prerequisite for anti-satellite attacks."[197] He continued by asserting China "will continue to deploy more advanced satellites through the next decade," and "developing jammers and kinetic and directed-energy weapons for ASAT missions."[198] Also in 2009, Lieutenant General Wallace Gregson (USMC, retired), then-Assistant Secretary of Defense for Asian and Pacific Security Affairs[199], testified that, in his opinion, China's efforts in ASAT development programs are "just one element of China's military modernization effort[s] to develop and field disruptive military technologies."[200]

In May 2013, China fired a launch vehicle or missile into GEO[201] as China's highest known suborbital launch to date. According to this report, Beijing claimed the launch was a high-altitude scientific experiment.[202] However, it also appears to be a test for China's new high-altitude antisatellite (ASAT) capability based on the dual-use missile technology. This test

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[197] *Ibid*.
[198] *Ibid*.
[199] Wallace "Chip" Gregson biography, then-Assistant Secretary of Defense, Asian and Pacific Security Affairs, undated, online: Department of Defense, <http://www.defense.gov/bios/biographydetail.aspx?biographyid=202> (accessed 15 March 2014).
[200] US, Senate Armed Services Committee, 111th Cong, *Hearing on Nominations Before the Senate Armed Services Committee*, (Washington, DC: 1st session, 28 April 2009), online: US Senate, <http://www.senate.gov/~armed_services/Webcasts/2009/April/04-28-09Webcast.htm> (accessed 15 March 2014).
[201] US, Craig Murray, *China Missile Launch May Have Tested Part of a New Anti-Satellite Capability*, for Military and Security Affairs, Research backgrounder, United States-China Economic and Security Review Commission (22 May 2013), online: US-China Economic and Security Review Commission, <http://origin.www.uscc.gov/sites/default/files/Research/China%20Missile%20Launch%20May%20Have%20Tested%20Part%20of%20a%20New%20Anti-Satellite%20Capability_05.22.13.pdf>(accessed 15 March 2014) at 3, n 1 [hereinafter Murray Backgrounder]: "DoD's full statement: We detected a launch on May 13 from within China. The launch appeared to be on a ballistic trajectory nearly to geosynchronous Earth orbit. We tracked several objects during the flight but did not observe the insertion of any objects into orbit and no objects associated with this launch remain in space. Based upon observations, we assess that the objects reentered the atmosphere above the Indian Ocean. We defer any further questions to the government of China." See also Andrea Shalal-Esa, "U.S. sees China launch as a test of anti-satellite muscle: source" (15 May 2013), in *Reuters*, online: Reuters International News Agency, online: *<http://www.reuters.com/article/2013/05/15/us-china-launch-idUSBRE94E07D20130515>* (accessed 15 May 2014); The Space Report, "Kunpeng-7" (undated), online: Global Security, *<http://www.globalsecurity.org/space/world/china/kunpeng-7.htm>* (accessed 15 May 2014).
[202] Ibid, Murray Backgrounder, at 3, n 2: "Xinhua's full statement: This test used a high altitude space probe rocket, which carried a payload of multiple scientific detectors such as Langmuir probes, high energy particle detectors, magnetometers, and barium powder release test devices, etc. to perform original state detection of high energy particles and electromagnetic field strength in the ionosphere and near earth space."

confirmed China's technology advancement that could potentially target U.S. Global Positioning System (GPS) as well as U.S. military and intelligence satellites. The extensive role of the Chinese military in China's civilian space programs "suggests these activities support the development of PLA space, counterspace, and conventional capabilities in addition to serving China's overall development strategy."[203]

In January 2000, the Hong Kong *Sing Tao* newspaper cited Chinese sources disclosing China's development of a "parasitic satellite" as an anti-satellite (ASAT) weapon.[204] On 20 July 2013, China launched 3 satellites, one of which was observed to have a robotic arm, and the government news service indicated that its purpose was "scientific experiments on space maintenance technologies."[205] China's deployment of the Chuangxin-3, Shiyan-7 and Shijian-15 brought significant uproar as the Shiyan 7 or Experiment 7 Satellite changed its orbit and moved closer to other satellites which were not Chinese.[206] According to another space observer, Jonathan McDowell's space report (Jonathan's Space Report No. 683):

> The SJ-15 satellite is thought to be carrying out observations of space debris, while SY-7 is testing a robotic arm. The CX-3 small satellite is thought to have been built by the Chinese Academy of Sciences and may be carrying technology experiments and/or serve as a target for the robotic arm tests.[207]

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[203] Ibid, Murray Backgrounder, at 14. See also Bill Gertz, "BREAKING -- China Successfully Conducts Satellite Capture In Space As Part Of Star Wars Military Program... US Satellites Now Clear Targets..." (2 October 2013), *The Washington Free Beacon*, online: Washington Free Beacon, <http://freebeacon.com/national-security/china-testing-new-space-weapons/> (accessed 30 October 2013) [hereinafter Gertz].

[204] Cheng Ho, "China Eyes Anti-Satellite System" (8 January 2000), in *Space Daily*, online: <http://www.spacedaily.com/news/china-01c.html> (accessed 15 March 2014). See Philip Saunders, et al, "China's Space Capabilities and the Strategic Logic of Anti-Satellite Weapons" (22 July 2002), *Center for Non-proliferation Studies*, Monterey Institute of International Studies, online: Center for Non-proliferation Studies, <http://cns.miis.edu/pubs/week/020722.htm> (accessed 15 March 2014).

[205] Yan Yan Xinhua, "China successfully launches 3 experimental satellites" (20 July 2013), online: Xinhuanet News, <http://news.xinhuanet.com/english/photo/2013-07/20/c_132557625.htm> (accessed 18 September 2013).

[206] Marcia S. Smith, "Surprise Chinese Satellite Maneuvers Mystify Western Experts" (19 August 2013), online: Space Policy Online, <http://www.spacepolicyonline.com/news/surprise-chinese-satelllite-maneuvers-mystify-western-experts> (accessed 18 September 2013).

[207] Jonathan McDowell, *Jonathan's Space Report No. 683* (20 July 2013), online: Jonathan's Space Report, <http://planet4589.org/space/jsr/back/news.683> (accessed 18 September 2013).

This testing of on-orbit servicing took another step forward on 2 October 2013 when it attached itself to another Chinese satellite while on-orbit.[208] Bill Gertz interviewed Rick Fisher, a Chinese military affairs specialist, who opined the robot-arm satellite attached to the Shiyan-7 is part of China's dual-use space program. Fisher explained that this satellite also had the capability to perform "military close-surveillance and attack missions" as well commercial functions such as the "development of space manipulator arm technology."[209] Fisher said:

> As an ASAT, a future version of the [Shiyan]-7 could be used to take close-up images of U.S. satellites, to remove systems from those satellites and return them to China, to directly damage U.S. satellites or to plant 'mines' on those satellites or close nearby...An [Shiyan]-7-like ASAT [weapon] gives China the option to attack enemy satellites without creating a large cloud of debris that may also damage other Chinese satellites…[During a recent space conference in China], Chinese officials made a deliberate appeal to Canada, which developed and built the manipulator arm used on the International Space Station and U.S. Space Shuttles [regarding their own robotic arm development]…[In addition], China made every effort to conceal the People's Liberation Army's role in the space program and would probably deny any military role in the developing mechanical arm technology for offensive space operations.[210]

The duality of this space asset fosters the mistrust and skepticism by U.S. analysts regarding Chinese statements asserting the non-weaponization and non-military use of outer space. It is true that this space asset can assist tremendously with China's efforts in building their own space station,[211] but it also has proven its capability to take offensive actions in time of conflict. China's military, like the U.S., is actively shaping the development of space technology while pushing new developments that will be otherwise advantageous from a self-defense or even

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[208] Gertz, *supra* note 203.
[209] *Ibid*.
[210] *Ibid*.
[211] Panfeng Huang, Yangsheng Xu, & Bin Liang, "Dynamic Balance Control of Multi-arm Free-Floating Space Robots," Dept of Automation and Computer-Aided Engineering (The Chinese University of Hong Kong (Hong Kong, P.R. China), Shenzhen Space Technology Center and, Harbin Institute of Technology (Shenzhen, P.R. China)), in *Int'l J Advanced Robotic Systems*, vol 2, no 2, 117 - 124 (2005), at 117.

offensive perspective. Although China is not alone as India and Russia have become more focused on space, it is China's activities in outer space that have captured the attention of the U.S. experts on China.

2. *Militarization Policy*

The Chinese space program has been under military control and authority dating back to 1967 when Zhou Enlai, then-prime minister of China, directed the space program fall under the PLA.[212] However, China declares internationally that it maintains the use of space for non-military purposes.[213] Despite China's outward political stance, China's military role (PLA) advocates for a more staunch stance on the use of the space and the development of technology for the future success and dominance of the Chinese State, not only in outer space, but in other mediums of contested control. China's position on militarization is very much like the U.S.'s position. The fear mongering that occurs, much like within the U.S., results in the acceptance and funding of developmental programs to ensure survivability. This internal strife appears to be maintained and driven by the PLA as well as the U.S. Military and Intelligence communities. Recognizing its technological limitations in space versus that of the U.S., China, according to a U.S. Congressional report, has turned its efforts to "developing capabilities that target potential vulnerabilities of the United States."[214]

This stance on "deterrence" and "counter-offensive" operations regarding U.S. militarization and weaponization of outer space is echoed publically by Chinese officials.

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[212] Harvey, *supra* note 170, at 325.
[213] China, White Paper, "China's Endeavors for Arms Control, Disarmament and Non-Proliferation" (2005), online: *Permanent Mission of the People's Republic of China to the United Nation's Office in Geneva, Switzerland and other international organizations in Switzerland*, < http://www.china-un.ch/eng/cjjk/cjzfbps/t210708.htm> (assessed on 30 October 2013).
[214] US, US-China Economic and Security Review Commission, *Report to Congress* (2008), online: United States-China Economic and Security Review Commission, <http://www.uscc.gov/index.php> (accessed 16 February 2009), at 161 [hereinafter 2008 Report to Congress].

According to Hui Zhang's analysis,[215] Chinese governmental officials summarize China's space policy as reactionary to U.S. military programs. Chinese officials assert that U.S. military space development will increase not only the cost of access to space, but also creating international instability with an arms race.[216] In April of 2002, Vice Foreign Minister Qiao Zonghuai summarized the official Chinese view of U.S. plans:

> Considerable progress has been made in outer space-related weapons research and military technology. It will not take long before drawings of space weapons and weapon systems [are] turned into lethal combat instruments in outer space. Meanwhile, military doctrines and [concepts] such as "control of space" and "ensuring space superiority" have been unveiled successively, and space operation [command] headquarters and combatant troops are in the making. If we should remain indifferent to the above-mentioned developments, an arms race would very likely emerge in outer space in the foreseeable future. Outer space would eventually become the fourth battlefield besides land, sea and air. If such a scenario should become reality it would be virtually impossible for mankind to continue their anticipated exploration, development and utilization of outer space, and all economic, cultural and social activities in connection with the utilization of outer space would be severely interrupted.[217]

The type of propaganda over U.S. and China's ambitions is pervasive and widespread with the effect of fostering fear on both sides.[218] The scientific community also shares in the widespread concern over these ambitions. Space technology development is occurring at a rapid pace and

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[215] Hui Zhang is a research associate in the Project on Managing the Atom at Harvard University's John F. Kennedy School of Government

[216] Hui Zhang, "Chapter 2: Chinese Perspectives on Space Weapons," in Podvig & Zhang, *supra* note 24.

[217] Qiao Zonghuai, "An Effective Way to Prevent an Arms Race in Outer Space The Early Negotiation and Conclusion of an International Legal Instrument" (3 April 2002), speech presented at the China/UN Disarmament Conference, online: fmprc.gov.cn, <http://www3.fmprc.gov.cn/eng/29794.html> (accessed 15 March 2014), cited in Podvig & Zhang, *supra* note 24, at Chapter 2.

[218] Jeremy Hsu, "Is the X-37B a prelude to space warfare" (10 May 2010), online: Christian Science Monitor, <http://www.csmonitor.com/Science/2010/0510/Is-the-X-37B-a-prelude-to-space-warfare> (accessed 15 March 2014). See also Freedberg, *supra* note 2; Yali Chen, "*TMD Issue Detrimental to Sino-US Relations*" China Daily, January 27, 1999. China Daily, US Air Force launches secretive space plane, 12 December 2012, online: ChinaDaily.com.cn, <http://www.chinadaily.com.cn/world/2012-12/12/content_16008053.htm> (accessed 15 March 2014): A China Daily article also warned that if the U.S. were to bring Taiwan into a TMD plan, "*Sino-US relations would suffer a setback unprecedented since the normalization of bilateral ties.*"

those within the industry want to push it further without the complications of new developments being consider a potential weapon to be exploited outside of its commercial purpose. A State merely calling something peaceful will never persuade others that additional military applications of the same technology are not being developed.

China's view is that U.S. space weaponization plans will have long term disastrous consequences for international security and the peaceful use of outer space.[219] China's nuclear policy is clearly expressed in its 2002 defense white paper: "China has always exercised utmost restraint on the development of nuclear weapons, and its nuclear arsenal is kept at the lowest level necessary for self-defense only."[220]

Professor Du Xiangwan, vice president of the Chinese Academy of Engineering, commented on his interpretation of the U.S. Air Force 2003 Transformation Flight Plan[221] to include "many types of space based weapons will be developed" and that "the tendency of space weaponization is obvious and serious."[222] He further pointed out that achieving military supremacy on Earth is not enough, as "the U.S. also seeks to dominate space."[223]
As one Chinese official stated:

> China is not in a position to conduct [an] arms race with [the] U.S. and it does not intend to do so, particularly in the field of missile defense. However, China will not sit idly by and watch its strategic interests being jeopardized without taking necessary measures. It is quite possible and natural for China to review its military doctrine and a series of policies on [its] relationship with big powers, Taiwan issues, arms control and non-proliferation, etc.[224]

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[219] Podvig & Zhang, *supra* note 24, Chapter 2.
[220] China, White Paper, "China's National Defense in 2002" (9 December 2002), by *Information Office of the State Council*, online: People's Daily Online, <http://english.people.com.cn/features/ndpaper2002/nd.html> (accessed 30 October 2013).
[221] US, US Air Force, "The U.S. Air Force Transformation Flight Plan" (November 2003), online: Air University, <http://www.au.af.mil/au/awc/awcgate/af/af_trans_flightplan_nov03.pdf> (accessed 30 October 2013).
[222] Podvig & Zhang, *supra* note 24, Chapter 2.
[223] *Ibid*.
[224] Hui Zhang, "Action/Reaction: U.S. Space Weaponization and China" (December 2005), in Arms Control Today, online: Arms Control Association, <http://www.armscontrol.org/act/2005_12/Dec-cvr> (accessed 5 November 2013).

These moderate voices do not hold the majority view as China tested its ASAT in 2007[225] and another "scientific" missile launch in 2013.[226] What is clear is how China will continue to develop its space program to counter the efforts of the U.S. The only way to stagnate space weapon development is by a binding treaty. China and Russia attempted to slow down space-based weapon development with the Draft PPWT. China and Russia offered this model treaty as a binding international treaty, but they themselves have not entered into a bilateral treaty regarding the terms of this treaty. China and Russia concede that Transparency and Confidence Building Measures (TCBMs) can stop an arms race. Article I of the PPWT defines a "Weapon in Outer Space" very broadly and based the intention of its use as:

> Any device placed in outer space, based on any physical principle, which has been specially produced or converted to destroy, damage or disrupt the normal functioning of objects in outer space, on the Earth or in the Earth's atmosphere, or to eliminate a population or components of the biosphere which are important to human existence or inflict damage on them.[227]

However, this broad definition was not accepted by Western States. China wants to dissuade the U.S. from pursuing space weapons and missile defenses internationally, while it continues to develop its own technology. A Xinhua news agency reported, "For countries that could never win a war by using the method of tanks and planes, attacking the US space system may be an irresistible and most tempting choice".[228] China's ASAT program is clear evidence of its desire

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[225] Kulacki, *supra* note 181.
[226] 2007 Chinese ASAT Test, *supra* note 173; Murray Backgrounder, *supra* note 202.
[227] PPWT, *supra* note 178, art I.
[228] Al Santoli, ed., "Beijing Describes How to Defeat US, in High-tech War; Russia-China Military Technology Agreement Detailed" (12 September 2000), in *American Foreign Policy Review Council, China Reform Monitor,* no 331, online: American Foreign Policy Council, <https:www.afpc.org/crm/crm331.htm> (accessed 30 October 2013). See also Richard J. Adams (Major, USAF) and Martin E. France (Colonel, USAF) (Air Force Space Command), "The Chinese Threat to U.S. Space Superiority" (Winter 2005), in *High Frontier: The Journal for Space & Missile Professionals,* vol 1, no 3, at 18; Kevin Pollpeter, "The Chinese Vision Of Space Military Operations" (2006), in *China's Revolution in Doctrinal Affairs: Emerging Trends in the Operational Art of the Chinese People's Liberation Army*, (James Mulvenon and David Finkelstein, eds), (Arlington, VA: Rand Corporation and the Center for Naval Analysis, 2006), at 360; J. Kevin McLaughlin (Colonel, USAF) and Chris D. Crawford (Colonel, USAF),

to counter the U.S.'s ability to use outer space via weapons that are terrestrially based. The PPWT goes on to say that:

> A weapon shall be considered to have been "placed" in outer space if it orbits the Earth at least once, or follows a section of such an orbit before leaving this orbit, or is permanently located somewhere in outer space.[229]

The PPWT includes a very broad definition on the "use of force" or the "threat force" as:

> The "use of force" or the "threat of force" mean any hostile actions against outer space objects including, inter alia, actions aimed at destroying them, damaging them, temporarily or permanently disrupting their normal functioning or deliberately changing their orbit parameters, or the threat of such actions.[230]

However, the PPWT bans only space-based weapons:

> The States Parties undertake not to place in orbit around the Earth any objects carrying any kinds of weapons, not to install such weapons on celestial bodies and not to place such weapons in outer space in any other manner; not to resort to the threat or use of force against outer space objects; and not to assist or induce other States, groups of States or international organizations to participate in activities prohibited by this Treaty.[231]

China understands the limitation of its technology as well as the U.S. advantage exercised during the first Gulf War. The PLA may view the U.S. over reliance on space systems to be a key vulnerability that can be easily exploited to their advantage. In also appears that China would rather counter the U.S. by denying the U.S. freedom of space and use of its own space assets. China's recent missile test if launched as a weapon targeting GEO space assets would obliterate

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"A Roadmap for Air Force Space (Part I)" (August 2007), in *High Frontier: The Journal for Space & Missile Professionals,* vol 3, no 4, at 23; Ashley J. Tellis, "Punching the U.S. Military's 'Soft Ribs': China's Antisatellite Weapon Test in Strategic Perspective" (June 2007), in *Carnegie Endowment Policy Brief,* no 51. See also, Ashley J. Tellis, "China's Military Space Strategy" (September 2007), in *Survival* vol 49, no 3, at 41-72 and Ashley J. Tellis, "China's Space Weapons" (25 July 2007), in *The Wall Street Journal*, online: Yale Global Online, <http://yaleglobal.yale.edu/special_report?page=qmarnheiuwledwtw%2C0%2C0%2C0%2C0%2C0%2C0%2C0%2C0%2C376> (accessed 15 March 2014).

[229] PPWT, *supra* note 178, art I(d).

[230] PPWT, *supra* note 178, art I(e).

[231] PPWT, *supra* note 178, art II.

that orbit with a massive debris field making it useless, not only to the U.S. but the rest of the international community. Earlier testing of ASATs by Russia and the U.S. have also not improved the situation of debris in outer space. However, as China's militarization and weaponization policy continues, it cannot hide behind scientific testing and the development of dual-use space applications. Based on the technology acquisition rate by China, the PLA, like any other State with nuclear weapons, intends to foster an environment where they will use whatever means to secure their survival, regardless of the type and source of threat.[232]

China is focused on using the PPWT, despite its lack of acceptance, as it diplomatic loudspeaker to support its international message of China's intent to prevent an arms race in space. However, China and Russia could sign and ratify the PPWT as a bilateral treaty in order to fully demonstrate their desire to prevent such an arms race in space. Despite their stance of weapons in space, the U.S., China and Russia will not restrict or limit their internal development of space technology or weapons. This failure to truly garner consensus regarding the Prevention of an Arms Race in Outer Space (PAROS) within the international community has allowed to the U.S. to effectively stagnate new legal regimes or other limitations that seek to prohibit or restrict the free use and access to outer space.

In October 2008, the U.S.'s public delegate, Karen E. House, stated in a letter to the Chairman of the 63rd Session of the U.N. General Assembly during a debate on the disarmament of outer space:

> It has been the consistent policy of the United States to oppose arms control concepts, proposals, and legally-binding regimes that seek or impose prohibitions on the use of space for military or intelligence purposes. The United States also opposes any arms control proposals which fail to preserve the right of the United

[232] Listner, *supra* note 25.

> States to conduct research, development, testing and operations in space for military, intelligence, civil or commercial purposes.[233]

China continues to highlight its own programs regarding space weapon development. *The Washington Times* reported a missile test performed by China in 2010 with 2007 ASAT system components.[234] This information was contained within a classified U.S. diplomatic cable and released by Wikileaks.[235] The diplomatic cable also contained notes where U.S. diplomats expressed their own concerns the Chinese government has hidden motives regarding space weapons.[236] Even then-Secretary of Defense Robert M. Gates could not bring China to the table to discuss their weapons programs (space, cyber and nuclear) and China's missile defense program.[237] In practice, China's continued pursuit of ASATs and its current experimental satellites can be viewed as politically damaging China's position within PAROS and its position on the non-militarization or weaponization of outer space. China's development of weapons and the militarization of its space program highlight the complexity of how a State's inherent right to defend itself versus its desire to operate freely and peacefully with other States.

3. *National View on Peaceful Use of Outer Space*

In 2001, Chinese Ambassador Hu Xiaodi, Head of China Delegation to the Committee on the U.N. Peaceful Uses of Outer Space (UNCOPUOS), expressed China's fears about an arms competition and its impact on the peaceful use of space:

> The country that takes the lead in deploying weapons in space will enjoy an advantage for a period, but it will not be able to monopolize space weapons. Other [S]tates, when they find it

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[233] *Ibid*. Although the US National Space Policy (2010) will consider arms control proposals, it will do so only if they are not contrary to US National Security concerns.
[234] Gertz, "ASAT Missile Defense", Inside the Ring, Washington Times, 9 March 2011, online: washingtontimes.com, <http://www.washingtontimes.com/news/2011/mar/9/inside-the-ring-846232496/?page=all#pagebreak> (accessed 15 October 2013) [hereinafter Gertz-ASAT Defense].
[235] This author did not review the diplomatic cable. Despite its disclosure by Wikileaks, the contents of this cable are still classified. This author relied solely on the summary of the cable provided by the Washington Times.
[236] Gertz-ASAT Defense, *supra* note 234.
[237] *Ibid*.

> affordable economically, scientifically and technically, will follow suit at a different pace and scale.[238]

The 2004 white paper on China's national defense outlined:

> Outer space is the common property of mankind. China hopes that the international community would take action as soon as possible to conclude an international legal instrument on preventing the weaponization of and arms race in outer space through negotiations, to ensure the peaceful use of outer space.[239]

Staying on message, Ambassador Li Daoyu, President of the China Arms Control and Disarmament Association, stated:

> As we cheer for every success of peaceful exploration and use of outer space, we also hear the approaching bugling of war. The space military technology is advancing rapidly. New military and combat concepts and theories like 'control of space' and 'occupation of space' are emerging. Research and development programs of space weapons are in implementation. The danger of the weaponization of and an arms race in outer space is ever more imminent.[240]

The development of weapons, by its own design, has the potential to jeopardize international peace and security. However, there is a counter argument. Weapons development also can have a direct deterrent effect without ever having been applied in combat. Nuclear weapons and its deterrent effect is a perfect example.[241] Although with the proliferation of States that now

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[238] Ambassador Hu Xiaodi, "A TREATY TO PROHIBIT WEAPONS AND WAR IN SPACE? MISSILES: HOW CAN WE REDUCE THE DANGERS THEY POSE?" (11 October 2001), for NGO Committee on Peace and Disarmament, in cooperation with the UN Department for Disarmament Affairs, and the UN Department of Public Information, online: Non-Governmental Organization (NGO) Committee on Disarmament, Peace and Security, <http://disarm.igc.org/2009backup/T101101os3.html> (accessed 19 September 2013).

[239] China, "White Paper on China's National Defense in 2004" (27 December 2004), by Information Office of the PRC State Council, online: Federation of American Scientists, <http://fas.org/nuke/guide/china/doctrine/natdef2004.html> (accessed 15 March 2014).

[240] China, Ambassador Li Daoyu, President of the China Arms Control and Disarmament Association, "Prevention of the Weaponization of and an Arms Race in Outer Space: An Urgent Task With No Time to Delay" (31 May 2005), speech presented at the International Conference on *Safeguarding Space Security: Prevention of an Arms Race in Outer Space*, online: *Permanent Mission of the People's Republic of China to the United Nation's Office in Geneva, Switzerland and other international organizations in Switzerland* <http://www.china-un.ch/eng/cjjk/cjthsm/t189254.htm> (accessed 30 October 2013).
2005/03/21

[241] Keir A. Lieber and Daryl G. Press, "The New Era of Nuclear Weapons, Deterrence, and Conflict" (2013), in *Strategic Studies Quarterly* (Fall 2013), online: Air University,

possess nuclear weapons, there is a natural shift towards disarmament of such weapons. The development of space weapons by the U.S., China and Russia could also have the same deterrent effect.

In December 2011, Zhang Wei, a spokesman for China's National Space Administration, stated, "China adheres to a principle of peaceful development in its space missions and the use of outer space for peaceful purposes" as outlined by China's white paper, "China's Space Activities in 2011."[242] Zhang Wei explained:

> It has been a common aspiration for the whole of mankind to explore, develop and utilize space for peaceful purposes…peaceful development as listed within the white paper demonstrates China's resolve in carrying out space activities in a peaceful way.[243]

In the 2011 white paper, China outlined the term "peaceful development":

> China always adheres to the use of outer space for peaceful purposes, and opposes weaponization or any arms race in outer space. The country develops and utilizes space resources in a prudent manner and takes effective measures to protect the space environment, ensuring that its space activities benefit the whole of mankind.[244]

However, just in 2013, China expanded and diversified its weapon system arsenals placing U.S. ships, aircraft, and installations in Asia within range.[245] China's PLA also is noted as a source of continued cyber, electronic warfare, and counterspace development focusing China's efforts to degrade or disrupt the command, control, communications, computers, intelligence, surveillance, and reconnaissance functions which are essential to U.S. presence and influence in the region.

<http://www.au.af.mil/au/ssq/digital/pdf/spring_13/lieber.pdf> (accessed 15 March 2014), at 9-10; see also Russ Wellen, "Nuclear Deterrence: Hardest Argument in the World to Refute" (30 March 2010), in *The Huffington Post*, online: Huffington Post, <http://www.huffingtonpost.com/russ-wellen/nuclear-deterrence-hardes_b_518525.html> (accessed 30 October 2013).

[242] Xinhua, "China to launch Shenzhou IX, Shenzhou X in 2012" (29 December 2011), in *China Daily*, online: China Daily, <http://www.chinadaily.com.cn/china/2011-12/29/content_14352962.htm> (accessed on 30 October 2013).

[243] *Ibid*.

[244] China Space Activities (2011), *supra* note 182.

[245] 2004 Annual Report, *supra* note 174 at 32-33 2013 Annual Report, *supra* note 174, at 29-30.

The PLA role within the China's Space Program clouds any statement made by China that its intentions are peaceful and that it opposes the weaponization of space.[246]

If the role of the PLA is as significant as it appears, then the real China Space Policy is one that reflects and strives for space dominance, much like that of the much maligned NSP authorized by President Bush. Further, China will not back away from stating their intentions are merely reactionary to the U.S.'s NSP.

Such a conclusion is supported by the numerous gaps within the PPWT[247], and those gaps are were drafted with Russian and Chinese positions on the disarmament of space. These gaps fail to gain international consensus on its purpose and undermine any effective attempt at true disarmament. A joint letter from the Russian Federation and China to the Conference on Disarmament[248] reflects these intentional gaps. First, the PPWT does not prohibit the use or

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[246] Michael Pillsbury, "AN ASSESSMENT OF CHINA'S ANTI-SATELLITE AND SPACE WARFARE PROGRAMS, POLICIES AND DOCTRINES" (19 January 2007), report prepared for *U.S.-China Economic and Security Review Commission*, online: <http://origin.www.uscc.gov/sites/default/files/Research/An%20Assessment%20of%20China's%20Anti-Satellite%20And%20Space%20Warfare%20Programs.pdf> (accessed 15 October 2013), at 10-14. See Christopher Stone, "Chinese intentions and American preparedness" (13 August 2007), in *The Space Review*, online: Space Review, <http://www.thespacereview.com/article/930/1> (accessed 15 October 2013). See also Edith M. Lederer, "Chinese colonel sees arms in space" (27 January 2007), in *The Washington Times*, online: Free Republic, <http://www.freerepublic.com/focus/news/1774636/posts> (accessed 12 November 2013).

[247] These gaps were highlight by the U.S. Ambassador to the Conference on Disarmament. U.S., LETTER DATED 19 AUGUST 2008 FROM THE PERMANENT REPRESENTATIVE OF THE UNITED STATES OF AMERICA ADDRESSED TO THE SECRETARY-GENERAL OF THE CONFERENCE TRANSMITTING COMMENTS ON THE DRAFT "TREATY ON PREVENTION OF THE PLACEMENT OF WEAPONS IN OUTER SPACE AND OF THE THREAT OR USE OF FORCE AGAINST OUTER SPACE OBJECTS (PPWT)" AS CONTAINED IN DOCUMENT CD/1839 OF 29 FEBRUARY 2008, 26 August 2008, by Christina B. Rocca, Ambassador Permanent Representative of the United States of America to the Conference on Disarmament, online: United Nations, <http://daccess-dds-ny.un.org/doc/UNDOC/GEN/G08/628/51/PDF/G0862851.pdf?OpenElement> (accessed 15 November 2013).

[248] China and the Russian Federation, LETTER DATED 18 AUGUST 2009 FROM THE PERMANENT REPRESENTATIVE OF CHINA AND THE PERMANENT REPRESENTATIVE OF THE RUSSIAN FEDERATION TO THE CONFERENCE ON DISARMAMENT ADDRESSED TO THE SECRETARY-GENERAL OF THE CONFERENCE TRANSMITTING ANSWERS TO THE PRINCIPAL QUESTIONS AND COMMENTS ON THE DRAFT "TREATY ON PREVENTION OF THE PLACEMENT OF WEAPONS IN OUTER SPACE AND OF THE THREAT OR USE OF FORCE AGAINST OUTER SPACE OBJECTS (PPWT)" INTRODUCED BY THE RUSSIAN FEDERATION AND CHINA AND ISSUED AS DOCUMENT CD/1839 DATED 29 FEBRUARY 2008, dated 18 August 2009, CD/1872, signed by Wang Qun, Ambassador for Disarmament Affairs, Head of Delegation of the People's Republic of China to the Conference on Disarmament and Valery Loschchinin, Ambassador Permanent Representative of the Russian Federation to the Conference on Disarmament, online: United Nations, <http://daccess-dds-

threat of force in outer space, just against "space objects." Further, the PPWT does not include any mechanism for verification.[249] Second, the PPWT shields members of the PPWT and does not limit any State's ability to act in self-defense under Article 51 of the UN Charter or under existing international law.[250] The PPWT also does not limit technology development, in space testing, or deployment of ASATs so long as they are not space-based nor used against another State.[251] Both China and Russia want development, testing and deployment of ground-based lasers and electronic suppression systems because the PPWT does not limit these in any way.[252] Finally, China and Russia asserted that dual-use technologies should be not addressed by the PPWT as further proof that China, Russia and the U.S. fully understand the value of "dual-purpose" space technologies, employed both for peaceful or aggressive purposes.[253]

Though China and the U.S. strive for peaceful uses of space, China will not allow the U.S. to dominate any medium: air, land, sea or space. China desires to carry more geopolitical influence in the region.[254] China will use whatever means that are available to them to achieve victory, to include a very powerful military tool: deception.[255]

CHAPTER THREE: THE LEGALITY OF APPLYING FORCE FROM SPACE

Even within American jurisprudence, Chief Justice John Marshall found that "the authority of a nation within its own territory is absolute and exclusive. . . . But its power to

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ny.un.org/doc/UNDOC/GEN/G09/631/75/PDF/G0963175.pdf?OpenElement> (accessed 15 November 2013)[hereinafter China and Russia Letter].
[249] *Ibid*, Response to Question 1.
[250] *Ibid*, Response to Question 2 and 3.
[251] *Ibid*.
[252] *Ibid*, Response to Question 6.
[253] *Ibid*, Response to Question 12.
[254] John J. Mearsheimer, "The Gathering Storm: China's Challenge to US Power in Asia" (2010), in *The Chinese Journal of Int'l Politics*, vol 3 (2010), 381–396, at 382. Professor Mearsheimer believes that China's rise cannot be done peacefully. *Ibid*.
[255] Sun Tzu, *supra* note 6.

secure itself from injury may certainly be exercised beyond the limits of its territory."[256] This principle of the "right of self-protection" as "a right recognized by international law" is expressly stated within U.S. Air Force doctrine and is still applicable today:

> Article III clarifies that international law applies to activities in outer space. The right of self-defense, as recognized in the United Nations Charter and more fundamentally in customary international law, applies in outer space. Also, law of war precepts such as necessity, distinction and proportionality will apply to any military activity in outer space."[257]

From a military perspective or acts exercised by a State, the defensive use of force by States has a documented history in international law. It is not clear, however, how the U.S. would interpret a commercial entity exercising such a right as a non-State actor, especially when Article VI and Article VIII of the Outer Space Treaty places the burden of control, supervision and liability on the appropriate State party.[258] The complication of addressing non-State actors clouds the issue as Article II of the Outer Space Treaty makes it clear that States bear the burden over all activities that occur in outer space.[259]

U.S. National Space Policy is moving progressively toward the protection of space assets and deterrence of bad actors or restrictions on the free use of outer space. Defending commercial corporate assets with political influence or action is not a new concept for the U.S.[260] Regarding U.S. national security, space assets have become a vital part of U.S. defense and warfighting

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[256] *Church v Hubbart*, 6 US (2 Cranch) 187 (1804). Despite the maritime domain, the context used by Chief Justice Marshall covered the application self-defense beyond a nation's borders which is just as relevant and applicable to outer space. *See also* Ian Brownlie, "International Law and the Activities of Armed Bands" (1958) 7 Int'l & Comp L Quarterly 712, 732; John Cobb Cooper, "Fundamental Questions of Outer Space Law" in *Space Law*, by Francis Lyall & Paul B. Larsen, eds (Burlington, VT: Ashgate Publishing, Ltd, 2007), at 66.
[257] AFDD 2-2, *supra* note 141, at 26.
[258] OST, *supra* note 7, art VI and VII.
[259] *Ibid*, art II. See also *United States Diplomatic and Consular Staff in Tehran (United States v Iran),* [1980] ICJ Rep 3.
[260] See generally, 1954 Guatemalan coup d'état (18–27 June 1954), CIA operation PBSUCCESS to remove the President of Guatemala, online: George Washington University, <http://www2.gwu.edu/~nsarchiv/NSAEBB/NSAEBB4/docs/doc05.pdf> (accessed 26 July 2014).

strategy.[261] Commercial space assets are becoming more integrated and utilized by the U.S. military as a method of fostering survivability and greater capabilities. The U.S. has even gone as far as leasing a Chinese satellite in order to provide coverage over some of its operations in Africa.[262] However, this reliance on foreign providers, much like that over the RD-180 rocket engine with Russia, is now met with objections asserting such dependence jeopardizes the national security of the U.S.[263]

China has a different approach regarding commercial activity. China, via state-owned or state-controlled enterprises[264], maintains a monopoly over their space industry and purchases of technology. This State-run set up allows for a far less complicated analysis because as a communist State, the Chinese government controls and acts as the operator of their space-based assets.[265] Therefore, China has less bureaucracy than the U.S. and can advance dual-use space technology in a commercial setting at a faster pace than U.S. private entities which must seek approvals from multiple governmental agencies. In addition, there is no question that China will act defensively to protect its space assets.[266]

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[261] Some have called "Desert Storm" the first space war. US, Department of Defense, *Report of the Secretary of Defense to the President and the Congress*, (Washington, DC: Government Printing Office, February 1992), at 85.
[262] Tony Capaccio, "Pentagon Continues Use of China Satellite in New Lease" (15 May 2013), in *Bloomberg Tech*, online: Bloomberg, <http://www.bloomberg.com/news/2013-05-15/pentagon-continues-use-of-china-satellite-in-new-lease.html> (accessed 26 July 2014).
[263] William Harwood, "ULA details engine initiative, unveils ads to counter 'misinformation'" (19 June 2014), in *CBS News*, online: CBS News Space, <http://www.cbsnews.com/network/news/space/home/spacenews/files/061814_ula_engines.html> (accessed 27 July 2014).
[264] US, *CHINESE STATE-OWNED AND STATE-CONTROLLED ENTERPRISES*, *Hearing Before the U.S.-China Economic and Security Review Commission*, 112th Cong (Washington, DD: US Government Printing Office, 2d session, 15 February 2012), online: U.S.-China Economic and Security Review Commission, <http://origin.www.uscc.gov/sites/default/files/transcripts/2.15.12HearingTranscript.pdf> (accessed 26 July 2014) at 78.
[265] US, *U.S.-China Economic and Security Review Commission Report to Congress* (2011), 111th Cong (Washington, DC: US Government Printing Office, 2011), at 40 (China's state-owned and state-controlled companies "receive massive government subsidies and are protected from foreign competition")
[266] China Defense 2010, *supra* note 177.

However, the analysis is much more complex if the U.S. allows such defensive force to be applied under the commercial development of private individuals, corporations and even public-private partnerships. When it comes to dual-use technology that may present a future threat to the U.S., every presidential administration, as well as the U.S. Congress, will want to secure these technologies for the benefit of its Defense Department.[267] Therefore, U.S. space activities are heavily controlled through its licensing authority and other outer space legislation and rules, such as the International Traffic in Arms Regulation.[268]

A. Legality of Military Use of Force and Weapon Limitations

Space arguably offers the best strategic position to address threats to territories on Earth as well as from space itself. Space-based assets can provide persistent and consistent defensive coverage without the need to refuel or land. Space has the potential to expand and expedite the global reach of a State, the capability to apply force or support to anywhere in the world in a matter of hours, not days. Therefore, a State can potentially address any threat to its security from anywhere in the world, as well as from outer space. However, there are vulnerabilities with space based assets, especially satellites.[269] There are gaps in coverage areas and the orbital patterns can be predictable, or fixed such as in GEO, simplifying "target acquisition". Also, lower orbits, such as LEO, shorten the lifespan of a space-based asset because of the fuel required to maintain it in a lower orbit. Also, the ability to destroy space-based assets can be simple and crude, especially when a State has zero concern for the debris field caused by their

[267] Andrea Peterson, "*SpaceX slow to break into lucrative military business*" (25 July 2014), in *The Washington Post*, online: Standard Examiner, <http://www.standard.net/Business/2014/07/25/SpaceX-slow-to-break-into-lucrative-business-of-launching-military-satellites.html> (accessed 26 July 2014).
[268] The Department of State Directorate of Defense Trade Controls governs the International Traffic in Arms Regulations (ITAR) 22 CFR. §§ 120-130, that manages the export controls over what is "considered to be" defense articles and services.
[269] AFDD 2-2, *supra* note 141, at 43.

actions.[270] In addition, space-based assets are highly susceptible to solar radiation and electromagnetic interference.[271]

The Outer Space Treaty establishes "the primary basis for legal order in the space environment."[272] It provides in Article III that:

> States Parties…shall carry on activities in…space, …in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international cooperation and understanding.[273]

Under this article, outer space law is governed by the general principles of international law (*lex generalis*), to include rules of customary law and those found within the U.N. Charter.[274] States may exercise their right of self-defense against activities of other States, with the ground rules for the use of force in space being the same as they are on Earth.[275] The application of force from space can be treated the same way as on Earth except for the prohibitions found in Article IV of the Outer Space Treaty, and those in the Moon Agreement for its signatories. Further, Article IX places an obligation on States to engage in international consultations before engaging in any activities likely to cause harmful interference with another nation's peaceful uses of outer space.[276] According to Michael Mineiro, a State conducting space activities that causes harmful

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[270] See generally, Michael N. Schmitt, "International law and military Operations in Space", in *Max Plank Yearbook of United Nations Law*, by A. von Bogdandy & R. Wolfrum, eds, vol 10 (Koninklijke Brill N.V., Netherlands, 2006), at 89-125.
[271] AFDD 2-2, *supra* note 141, at 43.
[272] Carl Q. Christol, *The Modern International Law of Outer Space* (New York: Pergamon Press 1982) at 20.
[273] OST, *supra* note 7, art III.
[274] Ivan A. Vlasic, "Space Law and the Military Applications of Space Technology" in N. Jasentuliyana ed, *Perspectives on International Law* (The Netherlands: Kluwer Law & Business, 1995) 385, 394 [hereinafter Perspectives on Int'l L.]; Bess C.M. Reijnen, *The United Nations Space Treaties Analyzed* 102 (Editions Frontieres 1992).
[275] However, it is not universally accepted that this includes the right to use force in self-defense. See Vlasic in Perspectives on Int'l L, *Ibid*, at 394; Hurwitz, *supra* note 166, at 71 (citing M. Chandrasekharan, editorial comment, "The Space Treaty," 7 Indian J Int'l L 61, 63 (1967)).
[276] OST, *supra* note 7, art IX. Harmful Interference is defined by the ITU Constitution, art 45: ITU Constitution, *supra* note 20, art. 45. See also *International Telecommunication Union Radio Regulations*, (Geneva: ITU 2012), at 1.169: "harmful interference" as: "[i]nterference which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service operating in accordance with Radio Regulations (CS)."

interference to another State Party to the ITU Constitution, Convention and Radio Regulations must, at a minimum, contact the affected States Parties to the Treaty to provide them with sufficient information to take appropriate actions to protect its space activities.[277]

Just like ships in international waters, one State's space assets or objects may use appropriate force proportional to the threat or use of force sufficient to stop or thwart an attack against it. This inherent right of self-defense is independent and Professor Ian Brownlie opined, "[n]or can there be any doubt that the armed forces of the flag state may use reasonable force to defend vessels from attack whether by pirates or forces acting with or without the authority of any state".[278] Thus, just as States defend their vessels on the high seas, States too have the right to defend satellites in space, covering all satellites, commercial and State-owned, on its national registry.[279] When a State exercises this right, there are limitations on the scope and duration of the force used. The purpose of such use must be justified under international law, as that is the standard that will ultimately be used to evaluate the lawfulness of the decision by a State to use force.

The first step is to identify the source if possible. U.S. space operations[280] begin this decision tree at the planning stage:

> Theater planners must also consider friendly space vulnerabilities as well as threats…are responsible for planning strikes on adversary counterspace capabilities or preparing alternatives for the possible loss of friendly space capabilities if strikes are neither appropriate nor feasible….if the intelligence value of the adversary

[277] Michael Mineiro, "FY-1C and USA-193 ASAT Intercepts: An Assessment of Legal Obligations under Article 9 of the Outer Space Treaty" (2008), 34(2) J Space L 321, at 338-339.
[278] Ian Brownlie, *International Law and the Use of Force by States* 1 (1963) at 305 [hereinafter Brownlie-Use of Force].
[279] Dinstein-War, *supra* note 44, at 186; see also Hurwitz, *supra* note 166, at 75; Perspectives on Int'l L, *supra* note 274, at 394.
[280] Nuclear Weapons Case, *supra* note 101. Much like the advisory opinion covering the Legality of Nuclear Weapons, an analysis of international law must look at which nations are actually engaged in the activity and what State Practice and *opinio juris* is behind the practical application of force in an international setting. For over 10 years, the U.S. has been engaged in combat operations globally and their activities are creating and establishing the legal basis for an assertion under customary international law.

> space capability is deemed more important…should consider available countermeasures. An essential part of this effort will be attack detection, assessment, and reporting. Operators and planners must know as quickly as possible the origin of any anomaly and be able to identify and geolocate the threat…Determining whether an event is the result of intentional attack, unintentional interference, or space weather is crucial in determining a course of action.[281]

This decision tree to determine whether or not the preemptive use or defensive use of force is warranted can be difficult to satisfy without an identifiable hostile act or demonstrated hostile intent. The State asserting this type of justification must consider several aspects of the source of the threat or harm: certainty, magnitude, and severity.[282] The response by the State must also have a probability of being successful while limiting the collateral impacts as much as possible without defeating the effectiveness of the response.[283]

The next step is to determine where on the spectrum of countermeasures what actions should be taken in order to address the threat or harm. There are no formulaic charts that dictate what action must be taken in response to a specific threat or harm suffered. Rather the analysis shifts to the requirement that the response action taken be justified based on necessity and proportionality.[284] For military use of force, a State's action must be tied an identifiable military necessity. There is no way to avoid the requirement of military necessity when it comes to the use of force.[285] The ICJ concluded that despite being generally contrary to international

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[281] AFDD 2-2, *supra* note 141, at 23.
[282] Howard M. Hensel, ed, "The Legitimate Use of Military Force: The Just War Tradition and the Customary law of Armed Conflict," in part of *Justice, International Law and Global Security Series*, Air War College, US Army (Ashgate Publishing Ltd: Hampshire, England 2008), at 102[hereinafter Hensel].
[283] *Ibid*.
[284] Nuclear Weapons Case, *supra* note 101, at para 105(2)E.
[285] Marcelo G. Kohen, "The Notion of 'State Survival' in International Law," in *International Law, the International Court of Justice and Nuclear Weapons*, by L. Boisson de Chazournes and P. Sands, eds (Cambridge: Cambridge University Press, 1999), at 293-314; Rein Müllerson, "On the Relationship between *Jus ad Bellum* and *Jus in Bello* in the General Assembly Advisory Opinion," in *International Law, the International Court of Justice and Nuclear Weapons*, by L. Boisson de Chazournes and P. Sands, eds (Cambridge: Cambridge University Press, 1999), at 267-274; Christopher Greenwood, "*Jus ad Bellum* and *Jus in Bello* in the Nuclear Weapons Advisory Opinion," in *International Law, the International Court of Justice and Nuclear Weapons*, by L. Boisson de Chazournes and P. Sands, eds (Cambridge: Cambridge University Press, 1999), at 247-266 [hereinafter Greenwood].

humanitarian law (distinction), the Court "cannot conclude definitively whether the threat or use of nuclear weapons would be lawful or unlawful in an extreme circumstance of self-defense, in which the very survival of a State would be at stake."[286] Self-defense within the context of military action is an absolute justification that will cure breaches of international humanitarian law.[287] This blending of *jus in bello* and *jus ad bellum* provides how States are free to apply force in circumstances where the international community views such actions as a "just war" or "supreme emergency."[288]

The actual application of force must also be within the context of the factual circumstances and consistent with international law and domestic policy of that State. For example, the U.S. employs an evolving set of ROE that can be tailored to the specific theater of combat or even mission set governing the application of force. However, every ROE has a provision providing U.S. military personnel the ability to exercise the inherent right of self-defense.[289]

The ICJ also referred to the *Martens clause*[290] *as* a general principle of public international law. Not only did the ICJ conclude this general principle as customary international law, but the Court also stated it "has proved to be an effective means of addressing the rapid evolution of military technology."[291] The ICJ affirmed that Martens clause served "as an affirmation that the principles and rules of humanitarian law apply to nuclear weapons,"[292]

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[286] Nuclear Weapons Case, *supra* note 101, at para 105(2)E.
[287] Greenwood, *supra* note 285, at 263-264.
[288] Michael Walzer, *JUST AND UNJUST WARS: A Moral Argument with Historical Illustrations* (Basic Books, Inc, New York 1977) at 251.
[289] SROE, *supra* note 89.
[290] The Clause was based upon and took its name from a declaration read by Professor von Martens, the Russian delegate at the Hague Peace Conferences 1899; see V. Pustogarov, "Fyodor Fyodorovich Martens (1845-1909)-A Humanist of Modern Times" (May-June 1996), in *International Review of the Red Cross (IRRC)*, no 312, at 300-314.
[291] Nuclear Weapons Case, *supra* note 101, at para 78.
[292] *Ibid*, at para 84.

which arguably means it applies to the application of all weapons, including those applied from outer space and with less consequence. The Martens clause reinforces the position that LOAC is not just positive legal rules on warfighting, but it also serves to overlay a moral code for the warfighter as well. The clause states that:

> In cases not included in the [Hague] Regulations …. populations and belligerents remain under the protection and empire of the principles of international law, as they result from the usages established between [civilized] nations, from the laws of humanity and the requirements of the public conscience.[293]

The U.S.'s submission to the ICJ regarding the legal status of nuclear weapons postured that "...with respect to the use of nuclear weapons, customs could not be created over the objection of the nuclear States whose interests are most affected,"[294] thus reinforcing the principle that within LOAC, States can prevent the development of law that would prohibit weapons within their possession. The only way to prevent their use would be through the consent of that State under a binding treaty. Therefore, those States with the most extensive military arsenals can potentially have the greatest influence on the future development of LOAC. In other words, the active and continued objection by States most affected by the change can prevent a *norm de lege ferenda* from creating a *norm de lege lata*.

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[293] *Preamble of the 1899 Hague Convention (II) with Respect to the Laws and Customs of War on Land (entered into force 4 September 1900) and 1907 Hague Convention (IV) Respecting the Laws and Customs of War on Land, Annex to the Convention, Regulations Respecting the Laws and Customs of War on Land,* opened for signature 18 October 1907, (1910) UKTS 9, (entered into force 26 January 1910). The modern Martens Clause is contained in Article 1(2) of the *Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts* (Protocol I), entered into force 7 December 1978, 1125 UNTS 3 (hereinafter AP I): "In cases not covered by this Protocol or by other international agreements, civilians and combatants remain under the protection and authority of the principles of international law derived from established custom, from the principles of humanity and from the dictates of public conscience."

[294] Rupert Ticehurst, "The Martens Clause and the Laws of Armed Conflict" (30 April 1997), in *International Review of the Red Cross*, no 317, online: International Committee of the Red Cross, <http://www.icrc.org/eng/resources/documents/misc/57jnhy.htm> (accessed 27 July 2014).

As discussed earlier, a State acting in self-defense must satisfy the principles of necessity and proportionality.[295] "Necessity" means the forceful action which is necessary to defend against an attack.[296] Necessity is internationally accepted to mean:

> Its application...calls for assessments of intentions and conditions bearing upon the likelihood of attack [in the case of 'anticipatory' self-defense] or, if an attack has already taken place, of the likelihood that peaceful means may be effective to restore peace and remove the attackers.[297]

Much like the use of force under a set of ROE, "necessity" in relation to self-defense is a condition precedent to justify the use of armed force.[298] When an attack occurs against a State, proportional force may be used to defeat an attack without further justification, despite a State's obligation to seek peaceful resolution under Article 2(3) of the U.N. Charter.[299]

This concept of "proportionality" is another element of self-defense.[300] Proportionality addresses the true meaning of self-defense which is to apply sufficient force to repel or prevent an attack or its imminent threat.[301] "The legitimacy of... [military] actions... is a question of degree, with civilian casualties a particularly relevant factor in assessing proportionality."[302] Therefore, "acts done in self-defense must not exceed in manner or aim the necessity provoking them."[303]

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[295] UN Charter, *supra* note 14, art. 51, see also, Nicaragua case, *supra* note 59, at 103, para 194, cited in Gulf Conflict, *supra* note 51, at 458; see also Brownlie-Use of Force, *supra* note 278, at 366; see also Armed Force, *supra* note 56, at 1635-38; and Jai Narain Singh, *Use of Force under International Law* (New Dehli: Harnam Publ'ns,1984), at 22-23 [hereinafter Singh-Use of Force].
[296] Arend & Beck, *supra* note 44, at 72.
[297] Armed Force, *supra* note 56, at 1635; cf. Brownlie-Use of Force, *supra* note 278, at 259.
[298] Armed Force, *supra* note 56, at 1635.
[299] Armed Force, *supra* note 56, at 1636.
[300] Armed Force, *supra* note 56, at 1637; see also Judith G. Gardam, "Proportionality and Force in International Law" (1993), 87 Am J Int'l L 391, 403; D.W. Greig, "Reciprocity, Proportionality, and the Law of Treaties" (1994), 34 Va J Int'l L 295, 305. Here, proportionality is either: (1) proportionality of an attacker's response to a grievance, or (2) proportionality in relation to the anticipated military value of a State's own actions in response or to the reciprocal force applied against an adversary's military actions.
[301] Singh-Use of Force, *supra* note 295, at 22.
[302] Gardam, *supra* note 300, at 405.
[303] Armed Force, *supra* note 56, at 1637

A counter attack[304], countermeasures[305] or counterspace[306] operations against the "source" of the attack can be expansive enough to deter future attacks. An attacked State can extend the battlefield "beyond the immediate area of the attack" to eliminate any continued threats of a continued attack.[307] The U.S. Air Force defines defensive space control as "[o]perations conducted to preserve the ability to exploit space capabilities via active and passive actions, while protecting friendly space capabilities from attack, interference, or unintentional hazards."[308] This can be aptly applied to outer space if the location of the attack is "beyond the boundaries of all States," such as when "[the attacking State's] destroys an [attacked State's] satellite put in orbit in outer space…."[309] In practice, military manuals on the laws of war limit how and when force can be applied under the acceptance of such measures by a State or non-State actors. These manuals include repeating criteria: (1) military necessity, (2) proportionality, (3) distinction/discrimination, and (4) chivalry.[310] These four principles are defined as follows:

> 1. Military Necessity: That principle which justifies those measures not forbidden by international law which are

[304] JP 1-02 (2013), *supra* note 88, at 2: "'Counterattack to deny a contested area or position to the enemy' under the term active defense." It is a responsive attack by part or all of a State's defending force against an enemy State's attacking force in order retake lost ground, destroy or isolate the enemy State's advancing units while denying the enemy State the capability of continuing to attack. In prolonged defensive operations, they are strategic actions to regain battle positions and targeted impact.
[305] *Ibid*, at 60: Countermeasures is defined as "[t]hat form of military science that, by the employment of devices and/or techniques, has as its objective the impairment of the operational effectiveness of enemy activity."
[306] AFDD 2-2.1, *supra* note 134, at 2: "Counterspace has offensive and defensive operations, which are dependent on robust space situation awareness (SSA). Counterspace operations are conducted across the tactical, operational, and strategic levels of war by the entire joint force (air, space, land, sea, information, or special operations forces). Within the counterspace construct, any action taken to achieve space superiority is a counterspace operation. Counterspace operations can be both offensive and defensive."
[307] Armed Force, *supra* note 56, at 1638.
[308] JP 1-02 (2013), *supra* note 88, at 69.
[309] Yoram Dinstein, *The Conduct of Hostilities under the Law of International Armed Conflict*, 2d ed (Cambridge: University Press, 2010), at 177.
[310] *Law of War Deskbook*, International and Operational Law Department, (Charlottesville, Virginia: The Judge Advocate General's Legal Center and School, 2001) 139-140 [hereinafter LOW Deskbook]. See also LOW, *supra* note 45.

> indispensable for securing the complete submission of the enemy as soon as possible.[311]
> 2. Proportionality: proportionality can mean one of two things: (1) proportionality of a belligerent response to a grievance, or (2) proportionality in relation to the adversary's military actions or the anticipated military value of one's own actions.[312]
> 3. Distinction/Discrimination: That principle where military attacks should be directed at combatants and military targets, and not civilians or civilian property.[313]
> 4. Chivalry: Dishonorable (treacherous) means, dishonorable expedients, and dishonorable conduct during armed conflict are forbidden.[314]

These LOAC principles guide the application of military force by States. These criteria are also part of the objective analysis to be applied in the aftermath of applying force. As long as these conditions are satisfied, the employment of force during hostilities is lawful. However, the analysis becomes more difficult in the case of a State that is the first to apply force, as the State that typically applies force first is deem the aggressor. Similar to ROE, a plan on the escalation of force may provide a solution while attempting to diffuse another State's hostile action before applying kinetic or non-kinetic force to end the hostility all together.

The question truly becomes can a State lawfully utilize force first or are the State's actions aggressive? The next section delves into this area of the law as a way to contemplate what defensive actions can be employed in outer space. In the context of self-defense, the only two criteria required are necessity and proportionality. However, both military action and an

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[311] US, Department of Army, Field Manual 27-10, *The Law of Land Warfare*, ch 8 (18 July 1956), para 3; *Protocol Additional to the Geneva Conventions of 1949, and Relating to the Protection of Victims of International Conflicts (Protocol I*), 8 June 1977, 1125 UNTS 3, [*API*]; Defined originally in the Lieber Code: "those measures which are indispensable for securing the ends of war, and which are lawful according to the modern laws and usages of war." Lieber Code, art. 14.
[312] LOW Deskbook, *supra* note 310, at 154.
[313] Ibid, at 154; AP I, art. 48 sets out the rule: "[p]arties to the conflict shall at all times distinguish between the civilian population and combatants and between civilian objects and military objectives and accordingly shall direct their operations only against military objectives."
[314] *Ibid*.

action in self-defense require some form of threat or grievance to not run afoul of the general prohibitions contained in Article 2(4) of the U.N. Charter.

B. Aggressive Use versus Non-Aggressive Use

Aggressive use of space is not necessarily an accurate synonym for non-peaceful uses. The pursuit of space has dramatically grown as more and more States develop space capabilities. This prolific use of space has taken on a new dimension of first in right, first in might. This aggressive occupation of space is still viewed as a "peaceful" use of outer space despite the dramatic increase in satellite launches and space debris. The occupation of space, as a once infinite resource, now begins to feel the impact of its prolific use, much like the High Seas. The High Seas is the current medium being exploited, but more importantly left full of debris and trash without anyone taking action to address this tragedy of the commons.[315] The intentional creation of significant space debris which potentially damages space assets, denies the use or access of a State to use space could be considered an act of aggression as well as a violation of Article IX of the Outer Space Treaty. By definition, aggressive occupation of space can include peaceful use without any weaponization while having the same harm in its destabilizing effect on international peace and security, especially between States who maintain an open rivalry, both politically and militarily. Aggressive actions in history usually took on more physical dimensions, whether by kinetic actions or physical occupation. With the evolution of today's technology, a State who engages in unintentional interference as a novice in utilizing space, but then in turn does nothing to cease such interference may be lawfully targeted based on its inaction or continued interference. Despite that novice State asserting the source of the

[315] Garrett Hardin, "The Tragedy of the Commons" (13 December 1969), in *Science, New Series*, vol 162, no 3859, at 1243-1248, online: American Association for the Advancement of Science, <http://www.jstor.org/stable/1724745> (accessed 21 July 2014). See also Brad Jessup and Kim Rubenstein, eds, *Environmental Discourse in Public and International Law*, (University Press, Cambridge, UK 2012) at 399-419.

interference is not within their territory or control, such inaction can still potentially change the dynamic from something innocent to something another State considers to be hostile enough to warrant action in response or perhaps some form of liability. The harm suffered must be shown to be direct and proximately caused by such State.[316]

Peaceful use of outer space has grown more out of the fear of how space would be used in an armed conflict. This fear is still resonant today and it is that fear that creates the pause to understand and analyze the secondary and tertiary consequences of using force in outer space. Another way to quail these fears is through the development of international warfighting manuals.[317] Duncan Blake opined that "the development and completion of such a manual [for space] could reduce the likelihood of war in space at all, or the severity if it does occur…"[318] This type of manual could also be employed for the growing market of commercial development, much like bilateral agreements handle disputes regarding commercial aviation. Unlike the ITU treaties and regulations, this manual could create the foundations of a multi-lateral treaty addressing several gaps identified by many scholars regarding space governance. Another alternative would be the creation of a new space treaty could contain specific provisions for binding consultations as well as provision governing liability for intentional acts, to include defining key terms within the space treaties that have gone without such clarification since 1972.

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[316] This issue was the topic of the 2013-2014 Manfred Lachs Space Law Moot Court Competition Compromis; online: International Institute of Space Law, <http://www.iislweb.org/docs/2014problem.pdf> (accessed 27 September 2013).

[317] See generally, Gustave Moynier, ed, *The Law of War on Land* (Oxford: Institute of International Law, 1880), Louise Doswald-Beck, ed, *San Remo Manual on International Law applicable to Armed Conflicts at Sea* (Cambridge: Cambridge University Press, 1995); Program on Humanitarian Policy and Conflict Research, *HPCR Manual on International Law Applicable to Air and Missile Warfare* (Cambridge, MA: Harvard University, 2010); Michael N. Schmitt, ed, *Tallinn Manual on the International Law Applicable to Cyber Warfare* (New York: Cambridge University Press 2012)..

[318] Duncan P. Blake, *THE LAWS OF STAR WARS-THE NEED FOR A 'MANUAL OF INTERNATIONAL LAW APPLICABLE TO SPACE WARFARE'* (LL.M Thesis, McGill University Institute of Air and Space Law, 2013) [unpublished], at iv.

Given a set of ground rules established by State practice and acknowledgment of the international community without objection or reservations, States are more likely to address peaceful solutions rather than quickly resulting to force in order to resolve a conflict. A set of rules, by custom or treaty, could also establish and clarify what can be considered to be hostile and aggressive actions warranting countermeasures or the use of force. Today, unintentional interference is a good model on how to resolve disputes in outer space, at least from the perspectives of those who are currently dominating outer space. The ITU under Article 11 would provide these space-faring nations an enormous advantage because in the field of radio spectrum management, they would be first in use and would have priority over that frequency use if there was a conflict regarding its use. The ITU priori plan and regulations reinforce the obligation not to interfere with certain critical functions such as GPS and emergency frequencies are a model of how aggressive actions can be deescalated and resolved quickly by creating stability and a standard of expectations that govern the use of outer space.

The ITU Constitution provides:

> Member States shall safeguard these channels and installations within their jurisdiction…. Unless other conditions are laid down by special arrangements**,** each Member State shall take such steps as may be necessary to ensure maintenance of those sections of international telecommunication circuits within its control.[319]

The responsibility to safeguard these channels and installations within their jurisdiction are critical to establishing responsibility for the continued use and protection around these critical frequencies. Without frequencies, a State cannot operate in outer space. The evolution of technology does not account for the intentional acts of interference caused by commercial vendors. Article 3, discussed in Chapter One, addressed armed force, not a private commercial

[319] ITU Constitution, *supra* note 20, art. 38(3)-(4).

entity trying to maximize its profits and market share by the deployment of space technologies designed to ensure their dominance in their competitive field.

C. Legality of Commercial Use of Force and Application Limitations

Why should we care about the commercial use of force in outer space? First, many States own and operate their commercial sectors utilizing space, which allows them a greater freedom to defend their space-based assets or use them offensively as they actively control and operate them. Second, corporate espionage is real[320] and the space business is booming.[321] States, like corporations, will do whatever they can to secure their survival in the global market.

The impact of commercial "abuses" can have a devastating impact on a State's economic stability and dramatically impact its political structure.[322] These acts are not governed by the basic principles of *jus in bello*, but economic sanctions are consistently employed openly by States to apply political pressure and garner international compliance as a method short of the use of force. However, with the private corporate side, there is also a seedy, secret, closed side designed to gain an economic advantage or even further develop the technology of another State. China's ability to conduct these types of operations, as state-sanctioned or state-run, places China at risk to a defensive response that may include force. These corporate actions can be wholly attributable to China.[323] Indeed, the body of law governing weapons and methods of

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[320] Michael A. Riley and Ashlee Vance, "China Corporate Espionage Boom Knocks Wind Out of U.S. Companies" (15 March 2012), in *Bloomberg*, online: Bloomberg Sustainability, <http://www.bloomberg.com/news/2012-03-15/china-corporate-espionage-boom-knocks-wind-out-of-u-s-companies.html> (accessed 20 May 2014).
[321] Mariel John, Michah Walter-Range & G Ryan Faith, "The Space Report 2013: The Authoritative Guide to Global Space Activity", report for Space Foundation (Colorado Springs: Space Foundation, 2013) and The Tauri Group, "State of the Satellite Industry Report", report for Satellite Industry Association (Washington, DC: SIA, 2013).
[322] Greg Berlocher, Greg. "Interference: Operators Making Advances in Flight" Satellite Today (1 June 2008), online: Satellite Today <http://www.satellitetoday.com/via/featires/23237.html> (accessed 14 July 2014).
[323] Michel Bourbonniére, "The Clausewitz Nebule: The Legitimacy of Military Activities in Outer Space During Armed Conflicts" (2010) 40 Isr YB Hum Rts 243, 250. See also Articles on State Responsibility, *supra* note, 87, at art 2: "[t]here is an internationally wrongful act of a State when conduct consisting of an action or omission: (a) is attributable to the State under international law and (b) constitutes a breach of an international obligation of the State." It may also trigger a State's ability to exercise self-defense based on actions of non-States: *Case Concerning Armed Activities on the Territory of the Congo (Congo v Uganda),* [2005] ICJ Rep 168.

warfare is vast, but commercial activities are regulated typically by domestic law. States, without any protections within their laws, passively authorizing such activity may find themselves responsible and liable under international law. However, there is the circumstance, much like terrorists as non-State actors, whereby a State can be absolved of its involvement because the post-launch, operation of the Satellite occurs in an area where there is no State jurisdiction because of the transfer of ownership.[324] For example, as technology advances, space-based systems or corporations could disavow themselves of a launching State's governance because they may never return to Earth or form their own government that is not a party to any space treaties.[325]

The U.S. defines Hostile Act as:

> An attack or other use of force by *any civilian*, paramilitary, or military force or terrorist(s) (*with or without national designation*) *against* the United States, US forces, and in certain circumstances, US nationals, their property, *US commercial assets, or other designated non-US forces, foreign nationals, and their property*. Force used directly to preclude or impede the mission and/or duties of US forces, including the recovery of US personnel and vital US Government property. *When a hostile act is in progress the right exists to use proportional force, including armed force, in self-defense by all necessary means available to deter or neutralize the potential attacker or, if necessary, to destroy the threat*.[326]

Corporate actions against a State or even within a State could meet this definition. The question changes from how a State can use force to what can a corporate entity do to defend itself from the hostile actions of another State or its corporate entity performing a State-endorsed operation

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[324] States ability to assert its jurisdiction over citizens or corporations extraterritorially depends on the domestic legislation or multi-lateral treaty granting such right. The High Seas falls under the jurisdiction of no one State, rather it falls to the mechanics of the U.N. This international forum is also the reason behind the inaction to address the harm being caused in this category of waters. See, *supra* note 315. In addition warfare is becoming less State-centric. Noah Weisbord, "Conceptualizing Aggression" (2009) 20 Duke J Comp & Int'l L 1, at 15.

[325] Jan Millsapps, "On Mars, Who's in Charge?" (16 May 2014), in *The Huffington Post*, online: Huffington Post Science, <http://www.huffingtonpost.com/jan-millsapps-phd/on-mars-whos-in-charge_b_5340588.html> (accessed 21 July 2014).

[326] US, AFI 31-117, ARMING AND USE OF FORCE BY AIR FORCE PERSONNEL, 29 JUNE 2012, at 6-8 [hereinafter AFI 31-117] [emphasis added].

that jeopardizes, not only the corporation's assets and financial stability, but also the national security of the State responsible for its outer space operations. A corporation maintains in certain legal jurisdictions those characteristics of a legal person. This inherent right of self-defense applied to the individual may provide the avenue for corporate action.

1. *Protection of Property and Use of Force*

How can a commercial entity apply force in outer space lawfully? Generally, domestic legislation would apply to those entities and where they are incorporated. Thus, a State would have to authorize or endorse the actions taken by a corporation. The U.S. authorizes its military to the use of deadly force under a certain and defined set of circumstances.[327]

> Deadly force is also authorized when individuals reasonably believe that a person poses an immediate threat of death or serious bodily harm to DoD forces. Unit self-defense includes the defense of other DoD forces in the vicinity. Deadly force is authorized in defense of non-DoD persons in the vicinity, when directly related to the assigned mission.[328]

The U.S. has also designated assets vital to U.S. National Security,[329] inherently dangerous property[330] (weapons, explosives, ammunitions, chemical agents, etc.) and assets critical to National infrastructure.[331] For these assets, the U.S. has authorized military protection to include the use of deadly force and to prevent actual theft or sabotage of these same assets.[332] Non-deadly force is evaluated by the same standards as deadly force: objective reasonableness[333] and

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[327] *Ibid,* at 32.
[328] *Ibid*.
[329] The DoD characterizes assets that are vital to national security "only when their loss, damage, or compromise would seriously jeopardize the fulfillment of a national defense mission." *Ibid*.
[330] Property is considered inherently dangerous if its theft or sabotage would present a substantial danger of death or serious bodily harm to others. *Ibid*.
[331] Assets critical to National infrastructure includes public utilities or similar critical infrastructure vital to public health or safety, and where the damage or destruction of such assets would create an immediate danger of death or serious bodily harm. *Ibid*.
[332] *Ibid*.
[333] The "reasonableness" of the use of force will be evaluated based on a reasonable person with similar training to exercise that force. *Ibid*.

the totality of the circumstances.[334] Therefore, the application of force will be a spectrum where deadly force is used as one of last resort. This defensive mindset is summarized perfectly by General William L. Shelton, commander of Air Force Space Command:

> Now, we have a clear and present danger, [and] our satellites were not built with such threats in mind,…I don't believe we can just continue the status quo, stick our heads in the sand, and just hope for the best. I don't think that's a good strategy at all.[335]

Threats like these are already out there and being employed by China. In 2006, China used ground-based laser to temporary obstruct U.S. satellites.[336] The response by the U.S. was not to destroy the source as use of force actions are still tempered by the collateral consequences, inaction even under President Bush's administration. If a State resorts too quickly to physical force or kinetic countermeasures, then such actions may lead to outright war. Assured access[337] to space is the primary objective and critical piece to U.S. NSS and by implication these same concerns are there for China. China's property is state-own or run property and they too have a vested interest in its security and preservation. China's spending and development of space technology continues to even today, to include testing of ASATs.[338] These measures are about protecting property on Earth, but those same concerns are expressed and felt by States in outer space.

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[334] *Ibid*, at 6-8.
[335] Freedberg, *supra* note 2.
[336] Christopher Williams, "Pentagon confirms Beijing's anti-satellite laser, Wi jammin', and I hope Yu like jammin' too" (6 October 2006), in *The Register*, online: The Register Science, <http://www.theregister.co.uk/2006/10/06/china_satellite_laser/> (accessed 6 July 2014).
[337] US, Joint Operationally Responsive Space Office, *Operationally Responsive Space*, online: ors.csd.disa.mil, <http://ors.csd.disa.mil/about-ors/> (accessed 21 July 2014). The Joint Operationally Response Space Office defines "assured" as "[s]ufficiently robust, timely, agile, adaptive, and resilient to achieve desired outcomes with a high degree of certainty."
[338] Zachary Keck, "China Conducts Third Anti-Missile Test: China's military conducted a successful land-based anti-missile test this week, following similar ones in 2010 and 2013" (24 July 2014), in *The Diplomat* online: The Diplomat Flashpoints, <http://thediplomat.com/2014/07/china-conducts-third-anti-missile-test/> (accessed 30 July 2014).

Corporations' assets are its life-blood because their revenue and survival are at times wholly dependent on these corporate assets. Corporate survival will depend on its safeguards and insurance policies covering its operations in outer space. However, such insurance is unlikely to cover the revenue stream generated by its corporate assets. In most circumstances regarding space assets, a corporation applying force is not applying deadly force because there are not humans on board most space assets. In addition, a corporation can already apply force in outer space as a satellite operator could elect not to maneuver its satellite. Thus, it would seem logical to allow corporate satellite operators the ability to take action to safeguard their space assets, especially when they are critical the national defense of a State. This rationale becomes even more acceptable if the corporate asset has humans or the citizens of that State on board. Individuals have the inherent right of self-defense to protect themselves and others from death or serious bodily injury. Here a State's legislative regulations play a crucial role in determining how a corporate entity can act when its employees or its space assets are in jeopardy. If they can act, then the question becomes how much force these corporations are allowed to take.

2. *Justified Countermeasure versus International Wrongful Act*

The International Law Commission (ILC)'s Articles on Responsibility of States for Internationally Wrongful Acts[339] summarizes and synthesizes generally accepted international norms reflected in international case law and many, if not all, are recognized as customary international law. Among these recognized facets of customary international law is the principle that:

> There is an internationally wrongful act of a State when conduct consisting of an action or omission: (*a*) is attributable to the State under international law; and (*b*) constitutes a breach of an international obligation of the State.[340]

[339] Articles on State Responsibility, *supra* note 87.
[340] Articles on State Responsibility, *supra* note 87, art. 2, *cf. Dickson Car Wheel Company v United Mexican States* (US v Mexico) (1931), 4 RIAA 669, at 678.

Moreover, "Every internationally wrongful act of a State entails the international responsibility of that State."[341] A State must determine what is necessary to protect an essential national interest from grave and imminent peril. The ICJ recognized the ILC's characterization of the doctrine of necessity as that reflecting customary international law. [342] As a matter of customary international law, the ICJ has also recognized necessity as precluding the wrongfulness of an act when the act is the only means for the State to safeguard an essential interest against a grave and imminent peril, and does not seriously impair an essential interest of the State towards which the obligation exists.[343] In other words, necessity may be invoked if compliance with an international obligation would be "self-destructive" as noted in the *Russian Indemnity* case.[344]

The response dictated by necessity can take the form of a countermeasure as a lesser means to address a wrongful act of another State. The ICJ stated the criteria for the lawfulness of a countermeasure in the *Gabčikovo-Nagymaros Project* case:

> In the first place it must be taken in response to a previous international wrongful act of another State and must be directed against that State…. Secondly, the injured State must have called upon the State committing the wrongful act to discontinue its wrongful conduct or to make reparation for it…. In the view of the Court, an important consideration is that the effects of a countermeasure must be commensurate with the injury suffered, taking account of the rights in question…. [I]ts purpose must be to induce the wrongdoing State to comply with its obligations under international law, and… the measure must therefore be reversible.[345]

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[341] Articles on State Responsibility, *supra* note 68, art. 1, *cf. Phosphates in Morocco, Preliminary Objections and Judgment (Italy v France),* (1938), PCIJ (Ser A/B) No 74, 10, at 28.
[342] Gabčikovo-Nagymaros Project, *supra* note 106, at 40.
[343] *Ibid*, at 40-41.
[344] Russian Indemnity (Russia v Turkey), 11 RIAA 421, 443 (Perm Ct Arb 1912).
[345] Gabčikovo-Nagymaros Project, *supra* note 106, at 52-57. See also Naulilaa (Portugal v France) (1928) II RIAA 1012 at 1026; *Cysne* (Portugal v France) (1928) II RIAA 1052 at 1057; and Air Services Agreement (France v US) (1978) 18 RIAA 416, at para 83.

Depending on the type of infringement, other treaties may play a factor is how a State addresses its countermeasures with options utilizing something less than force or what could be construed as force. As part of the countermeasure principle, States must utilize such measures to garner compliance by another State of its obligations under international law. For example, the ITU Constitution provides, "…Member States undertake to inform and, as appropriate, assist one another with regard to infringements of the provisions of this Constitution, of the Convention and of the Administrative Regulations."[346] This "notice" and "consultation" piece of the countermeasures test to cease such activities can be satisfied by the slightest effort to make another State aware as such State may elect to ignore the issue, despite the on-going effects on the impacted State. Under international law, there is no obligation to provide the full details of what form countermeasures will be or their potential effects,[347] but simply the assertion that such wrongful actions must cease.

However, the effects of the countermeasure must be commensurate with the wrongful action. This by no means must be equal; however, it must be proportional in response to the wrongful action in order to maintain its lawfulness. Addressing a persistent danger of loss of life and property represents sufficient grounds to exercise countermeasures to a specified degree commensurate and sufficient enough to address and correct another State's wrongful actions. Countermeasures cannot be used to shield an illegal act and must also have the attributes of being reversible. However, reversibility of all the effects of a countermeasure, as opposed to the countermeasure itself, is not an absolute requirement. Article 49 on the ILC Articles on State Responsibility states, "Countermeasures shall, *as far as possible*, be taken in such a way as to

[346] ITU Constitution, *supra* 20, art. 39.
[347] Articles on State Responsibility, *supra* note 87, art. 52.

permit the resumption of performance of the obligations in question",[348] and the commentary clarifies that:

> [T]he duty to choose measures that are reversible is *not absolute*. It may not be possible in all cases to reverse all of the effects of countermeasures after the occasion for taking them has ceased.[349]

The next question is how far can countermeasures be applied and do they prohibit the use of kinetic action in order to rectify the harm suffered. Article 50(1)(a) limits countermeasures by expressly stating:

> 1. Countermeasures shall not affect:
> (*a*) the obligation to refrain from the threat or use of force as embodied in the Charter of the United Nations;[350]

Forcible countermeasures are prohibited as outlined in the *U.N. Declaration on Principles of International Law concerning Friendly Relations and Cooperation among States in accordance with the Charter of the United Nations*. The General Assembly stated expressly "States have a duty to refrain from acts of reprisal involving the use of force".[351] This prohibition was also declared to be customary by the ICJ.[352] This prohibition applies to countermeasures and not self-defense.

3. <u>*National Authorization*</u>

International law analyzes self-defense as actions taken by States or that can be attributable to States. However, States can provide consent or even ratify actions over those entities it has responsibility or such actions that would otherwise be attributable to that State.

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[348] Articles on State Responsibility, *supra* note 87, art. 49(3) [emphasis added].
[349] *Ibid*, art. 49, note 9 [emphasis added].
[350] *Ibid*, art 50.
[351] General Assembly Resolution 2625 (XXV), *supra* note 14, at annex, first principle. The Conference held on Security and Co-operation Final Act has an explicit condemnation of forcible measures. Principle II of the *Declaration on Principles Guiding Relations between Participating States* reads: "Likewise [the participating States] will also refrain in their mutual relations from any act of reprisal by force."
[352] Corfu Channel Case, *supra* note 107, at 35; and Nicaragua, *supra* note 59, at 127, para 249.

The Presidential Policy Directive (PPD) 21, *Critical Infrastructure Security and Resilience*, focused on existing public and private sector resources ensuring continuity if a catastrophic cyber or terrorist attack occurred.[353] Homeland Security Presidential Directive 7 (HSPD-7) brought national security policy into "public-private partnership" concepts through the National Security Council shaping government interaction with private sector owners/operators regarding infrastructure protection and urging cooperation with private sector owners/operators.[354]

Much like the military services, a State could authorize certain ROE to address commercial threats and defensive use of force by its commercial assets against other States. Being able to defend effectively can be determined by how low its takes to mount such a defense. These ROE could require verbal notification and approval of the President or Secretary of Homeland Security or Defense before exercising extreme defensive maneuvers by a corporation to protect an asset critical to the U.S.'s national defense. It could also outline what defensive measures could be applied in a spectrum based on a decision tree and analysis of the threat against the asset. Such measures could include when to evade, if possible, as well as utilizing the Department of State to open diplomatic lines of communication to resolve the issue peacefully. This exception would not apply to every space asset, but those determined to be

[353] US, President of the United States of America, Presidential Policy Directive (PPD) 21, *Critical Infrastructure Security and Resilience*, 12 February 2013, online: Office of the Press Secretary, <http://www.whitehouse.gov/the-press-office/2013/02/12/presidential-policy-directive-critical-infrastructure-security-and-resil> (accessed 14 July 2014); US, President of the United States of America, Executive Order (EO) 13636, *Improving Critical Infrastructure Cybersecurity*, 12 February 2013, online Office of the Press Secretary, <http://www.whitehouse.gov/the-press-office/2013/02/12/executive-order-improving-critical-infrastructure-cybersecurity> (accessed 14 July 2014).

[354] US, President of the United States of America, Homeland Security Presidential Directive 7: *Critical Infrastructure Identification, Prioritization, and Protection*, 17 December 2003, online: Department of Homeland Security, <http://www.dhs.gov/homeland-security-presidential-directive-7#1> (accessed 14 July 2014) [hereinafter HSPD-7].

critical to the U.S. infrastructure and national security would be likely candidates if they are owned and operated via a public-private partnership or corporate entity.[355]

China would already have this authority as it maintains a high degree of control over its space program and the assets used within its program. Every State with a satellite has the capability to apply force in outer space. From laser beams to a satellite with a robotic arm capable of capturing satellites or de-orbiting them, the Chinese operator of these functions is likely to be an agent of the government. Space development takes on a different moniker as private industry is fostering development of space technology within the U.S. space industry. These corporate entities will seek action by the U.S. when threatened or any type of force (no matter how remote like interference) is applied to any of their space-based assets. The U.S. has a choice of using its military to defend such assets or it could allow these corporate entities to take on some defensive counter actions, to include temporary, passive or non-kinetic actions, designed to thwart those actors seeking to harm the U.S. and its interests in outer space.

The consequences faced by a commercial corporation using force in space, without the consent of the registered State, could be the loss of its license from the State which would be responsible for the oversight of such corporation. In addition outside of the liability convention, a State, depending on its own domestic legislation, could also seek indemnification from the corporation for any damage claimed by the harmed State. A corporation could also apply defensive force without the consent of a State. It is more likely that the development of such authority will occur in the non-kinetic cyber protection areas of satellites to prevent the misuse or abuse of their space systems. Corporations can already take passive measures to protect their assets. Corporations could turn off their space asset, maneuver it, and even tailor the response to

[355] Bruce Carlson (Lieutenant General, USAF), "Protecting Global Utilities: Safeguarding the Next Millennium's Space Based Public Services" (2000) Aerospace Power J 37, 39-40.

specific transponders for communication satellites. For earth observation satellites, corporations could also deny such services to those countries that harbor actors that target the optics of a corporate satellite.

However in the U.S., corporations must also comply with U.S. domestic law. Interference with the authorized operations of a satellite is a crime under 18 U.S.C. § 1367. This statute outlines as a criminal offense to "intentionally or maliciously interfere with the authorized operation of a communications or weather satellite, or to hinder any satellite transmission."[356] This covers all interference, to include jamming, of any transmissions related to the satellite and the related ground segment. The only caveat is that such statute "does not apply to any lawfully authorized investigative, protective, or intelligence activity of a law enforcement agency or of an intelligence agency of the United States."[357] One could argue that such caveat does not apply to the military. This analysis would vary greatly when applied to a State that does not have such domestic prohibitions or express authorizations regarding defensive use of force of a corporate space asset.

For those States trying to attract space industry to their countries, this could be an incentive to be registered under such a State. States could provide specific legislation that would allow their corporations to defend corporate property under the State's jurisdiction and control as outlined by the OST. The legislation could also include various levels of approval regarding the force to be applied and the nature of the collateral damage or debris created by the use of force. States would remain internationally responsible based on legislation and the provided license to operate. States authorizing such action must also take into account how these State approved actions comply with the U.N. Charter and applicable international law. The "use of force"

[356] US, *Interference With the Operation of a Satellite*, Title 18 USC § 1367 (1986).
[357] *Ibid*.

standard that applies to a State would apply to the corporate action as a State is the responsible party under the U.N. Charter and under international law.

4. *Impact of Sanctions or Inaction by International Community*

As Bin Cheng observed, "A Party who asks for redress must present himself with clean hands."[358] Under international law, the clean hands doctrine means "a claimant's involvement in activity illegal under either municipal or international law may bar the claim."[359] Indeed, as Sir Hersch Lauterpacht wrote, "The principle *ex injuria jus non oritur* is one of the fundamental maxims of jurisprudence. An illegality cannot, as a rule, become a source of legal right to the wrongdoer."[360] This is a defense and results in the lack of action from the international community.

Today, the culture of inaction seems to be the most prevalent. The U.S. policy to openly declare their opposition to any international practice that would otherwise limit their freedom of action. Other States, like China, fearing the worse, may develop their own counterspace programs damaging the international trust needed to foster peace and stability. This control and superiority over space can be viewed as necessary to ensure a State can exercise its freedom rights in space, even if there has been no outward action that would otherwise place a State in a position of being hindered in the State's exploration of space. Fear that the U.S. was developing a "Dooms Day" device in outer space is just one example. However, it is abundantly clear that U.S. Policy demands the command of outer space by aiding and assisting others in dictating space practices that does not in any way inhibit U.S. freedoms on the use of outer space. For those who demand action, this policy of inaction may deny some States their stake in the outer space because they are slow in

[358] BIN CHENG, *General Principles of International Law as Applied by International Courts and Tribunals* (Oxford: Cambridge University Press, 1953) at 155.
[359] IAN BROWNLIE, *Principles of Public International Law* 7th ed (Oxford: Oxford University Press, 2008) at 503 [hereinafter Brownlie-Public Int'l Law].
[360] HERSCH LAUTERPACHT, RECOGNITION IN INTERNATIONAL LAW 420-421 (Cambridge University Press, 1947).

being able to fund expensive space technology. Without an international space treaty accepted by all space faring nations, there is no specific binding guidance on the actual use of outer space such as an obligation to avoid collisions or to clean up a State's space debris. Existing customary practices may not be sufficient to establish a binding law to be applied to any State based on the variations of current practice outside of those principles which have been argued to be customary international law.

More often than not and with a growing consensus of distrust and disgust, international sanctions can be imposed in an effort to garner compliance. Sanctions on Iran and North Korea have garnered some concessions to the international community in exchange for sanction relief.[361] This somewhat effective means of gaining compliance cannot overcome those States which have the ability or the international weight to make such sanctions ineffective. Thus, what are States to do in order to garner compliance from another State that is impacting their national security or critical infrastructure? Some States unfortunately are left holding the bag, wanting action and getting nothing from the international community, as in Syria and the Ukraine. It is this paradigm that some States have ventured off on their own to create havoc, just to demonstrate their international presence. North Korea is one example and as China continues its policy of intervening and offering support, this type of instability in the region will remain a high priority to other States in the region.[362]

How will the U.S. or China react to provisions of International Law, to include the U.N. Charter that conflict with their own national policy and doctrine regarding the use of force or the

[361] Sue Eckert and Thomas Biersteker, "The Impacts and Effectiveness of UN Nonproliferation Sanctions: A Provisional Report: Iran and North Korea" (2012), in a report prepared for the International Security Research and Outreach Programme International Security and Intelligence Bureau, online: Foreign Affairs, Trade and Development Canada, http://www.international.gc.ca/isrop-prisi/assets/pdfs/Report-CCDP_Sanctions.pdf> (accessed 8 August 2014).
[362] Some may also argue that this the US position regarding PAROS and Israel.

development of space weapons? Will China and the U.S. give international law the recognition of being superior to its own domestic agendas? What is clear is that both States have expressed their desire to defend themselves to the fullest extent within their power and scope, regardless of any diplomatic or international commitment that would otherwise limit their ability to do so. However, they would only decimate space as a last resort because of the significant impact such an action would have on space and the world's reliance of space. Each State recognizes international law and its place in creating, sustaining and further developing international peace and security. As the ILC has recognized, "[t]he wrongfulness of an act of a State not in conformity with an international obligation towards another State is precluded if and to the extent that the act constitutes a countermeasure taken against the latter State."[363] This same exclusion applies if the action is necessary and proportional from a perspective of self-defense. If the action taken in self-defense is necessary and proportional, then it would otherwise comport with international law which would eliminate any discussion regarding which would have priority. However as it appears today, both States would choose to act based on their own policies and position papers, then suffer debilitating harm that would eviscerate their State or its citizens. To a certain extent, this would apply even if the decision to act was not founded on the best information, but more so on the fear there would be no recovery from inaction. On the international level, it is more likely to settle disputes bilaterally with binding results then through international forums as they are limited when commanding compulsory and binding decisions.

CONCLUSION

Space is subject to existing international law. In general, what is not expressly prohibited can be generally permitted and shaped by the exercise and recognition of State practice and

[363] Articles on State Responsibility, *supra* note 87, at art. 22 and arts. 25 & 49-54.

Opinio Juris under customary international law. However, merely because a State can lawfully take action does not necessary mean that it should and would. Most times, there are other factors that a Nation's leadership must consider and weigh because the collateral impacts on one choice can have long lasting impacts, especially in the realm of outer space. A State must weigh the strategic impact such use of space will have as other nations may also take the same approach. This slippery slope of being reactionary does not bode well to foster international peace and security.[364] Although a manual on counter or offensive space operations endorsed by the international community would be appreciated, it will not guarantee peace and security of outer space unless it is codified in a new space treaty. As technology becomes more prevalent and cheaper, it will open doors to potential bad actors seeking to harm other States based on their own ideological beliefs. That does not mean a State should focus its resources solely to those threats as States today are developing their own space weapons whether they publicly acknowledge such activity or not. Every State would like the best available technology to defend itself.[365] The sale of arms and other goods associated with fighting wars is a trillion, if not a multi-trillion dollar industry.[366]

Further despite a State's best intentions and legislation, commercial entities will need to understand and learn how to defend themselves as they may be at the forefront of outer space exploration. If rules governing their operations in outer space are not developed today, then corporations may conduct their operations without any oversight in the darkness of deep space. There will be no government watching their every move despite being ultimately responsible for such action in space. With domestic and international laws that establish a clear set of rules,

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[364] An arms race in space is inevitable. Erik Seedhouse, *THE NEW SPACE RACE: China vs. the United States* (Chichester, UK: Praxis Publishing, Ltd, 2010), at 106 [hereinafter Seedhouse].
[365] *Ibid*, at 51-59, 104-106, and 223-229.
[366] Anup Shah, "The Arms Trade is Big Business" (6 January 2013), in *Global Issues*, online: Global Issues Arms Exports, <http://www.globalissues.org/article/74/the-arms-trade-is-big-business> (accessed 15 July 2014).

States can foster moral and ethical corporations that apply use of force defensively and appropriately. Only under these conditions will governments be better prepared for the next stage of space exploration. These rules or instructions do not have to be exact, but could create standards of conduct preparing corporations to act with "due regard" and setting a standard of care to evaluate negligence claims under the liability convention.

Allowing corporations to exercise the individual right of inherent self-defense might be limited to the preservation of life rather than property. However, the circumstances surrounding when it is acceptable to use force is a topic the international community should not be afraid to discuss; rather it should be embraced as a natural course of history for everyone to understand and apply judiciously. It is very easy to fire and forget. The severity of action highlights the devastation to innocent lives, endangering what society holds most dear, while securing condemnation from the international community. Creating a standard of lesser options before resorting to force would be prudent. This pause in action would allow the time necessary to evaluate whether the use of force is even necessary because such actions could lead to war or even the destruction of mankind. Kinetic action can be devastating to the entire space environment with long term effects.

However, the use of force can be legally justified. Although the offensive use of space would likely not occur until open hostilities or war was declared against an opposing State, defensive use of force can be applied to outer space. The use of force outlined above can be applied and permitted to protect military and commercial applications if a State determines these measures are warranted to defend and protect its national infrastructure and space-based assets. This scenario is even less complicated if manned space-based assets are attacked, especially when the crew contains civilians or unarmed military personnel not engaged in any hostilities as these individuals have their own inherent right of self-defense. No matter where force is being

applied, a State will likely be involved or responsible in some form or fashion. If a State is engaged in the use of force, then LOAC rules would apply. This international standard will be used to question the validity of any action in space. If the U.S. applies force in space, States like China and Russia will follow using the same justification as well as other space-faring States.

Rather than condemning all uses of military force as morally wrong, just-war theorists submit that recourse to war is permissible when certain conditions are met. Just cause and righteous intent are two of the conditions typically identified by just-war theorists. Wars fought in self-defense meet these criteria by having a morally good objective and by being waged to correct a serious transgression and re-establish peace and justice. This exception to the prohibitions in international law and the U.N. Charter on force allows States to take action they deem necessary in space to protect and defend its property, despite no territorial assertion. As the eighteenth century Swiss legal scholar Emmerich de Vattel warned, "A Nation has the right to resist the injury another seeks to inflict upon it …. It may even anticipate the other's design, being careful, however, not to act upon vague suspicions, lest it should run the risk of becoming itself the aggressor."[367] In the future, corporations may take more of a role in taking action because of the need to act quickly and decisively in order to defend the critical space assets of a State. If the State's corporate ROE is clear, then corporations can operate decisively and timely to demonstrate hostile intent or hostile actions while maintaining a State's compliance with the U.N. Charter and international law.

[367] Hensel, *supra* note 282.

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