LEGAL ASPECTS OF THE USE OF FORCE IN SPACE

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The opinions and conclusions expressed herein are solely those of the author writing in his personal capacity. They are not intended to, and do not necessarily reflect the views of the Government of Canada, the Canadian Forces, or the Office of the Judge Advocate General.

To Beverley, Kathleen and Matthew
whose patience and support have been unwavering

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ABSTRACT

As the advantages of space based systems to support global communications, data transfer, navigation and military activities have been identified and exploited through the decades, the economic and security well being of many nations has become increasingly dependent upon space. In a world of evolving threats, dependence has highlighted the vulnerability of space assets. This thesis considers the current legal framework governing outer space and whether or not the framework supports space weaponization and the use of force in space. Chapter One provides an overview of the journey into space and how the military has taken advantage of space. In Chapter Two, the international legal regime governing outer space is analyzed, and the principle of "peaceful purposes" examined. Chapter Three considers the legal authority to resort to the use of force under international law, how that law applies in the outer space environment and briefly addresses arms control restrictions in outer space. Chapter Four focuses on the future, considering the question of whether or not space weaponization and the use of force in space are inevitable developments in the evolution of uses of space or, if there are viable alternatives that will address valid security concerns while preserving space as a weapons free environment.

RÉSUMÉ

Les avantages de l'utilisation des systèmes opérant dans l'espace à des fins de communications, de transfert de données, de navigation et d'activités militaires ont été identifiés et exploités depuis des décennies. La santé économique et la sécurité nationale de plusieurs nations sont ainsi devenues, au fil de ces années, de plus en plus dépendantes de cette utilisation de l'espace. Dans un monde où la menace est constante, la dépendance de plusieurs pays face à cette technologie de pointe place la vulnérabilité des équipements en orbite sous une toute autre perspective. Cette thèse examine le cadre juridique actuel du droit spatial et tente de déterminer si celui-ci permet la militarisation et l'emploi de la force dans l'espace. Le premier chapitre est une vue d'ensemble de notre conquête de l'espace et touche la façon dont les militaires l'ont exploité. Au chapitre deux, on analyse le droit spatial international et une attention particulière est apportée au principe de l'utilisation « exclusivement à des fins pacifiques ». Le troisième chapitre traite du cadre juridique de l'emploi de la force en droit international et de son applicabilité dans l'espace. On y aborde également la question du contrôle des armes et des restrictions relatives à leur utilisation dans l'espace. Le dernier chapitre est un regard vers le futur et explore la question de savoir si la militarisation et l'emploi de la force dans l'espace constituent une évolution inévitable de la conquête de l'espace ou si des alternatives viables existent, qui pourront à la fois traiter et régler les préoccupations valables reliées à la sécurité, tout en préservant un environnement spatial sans armement.

ACRONYMS AND ABBREVIATIONS

ABM	Anti Ballistic Missile
A.F.L.Rev	Air Force Law Review
Am. J. Int. L.	American Journal of International Law
Ann. Air & SP. L.	Annals of Air and Space Law
ASAT	Anti-Satellite
Can T.S.	Canada Treaty Series
CFE Treaty	Treaty on Conventional Armed Forces in Europe
CHM	Common Heritage of Mankind
COPUOS	Committee on the Peaceful Uses of Outer Space
CTBT	Comprehensive Test Ban Treaty
ENMOD Convention	Convention on the Prohibition of Military or any Other Hostile use of Environmental Modification Techniques
GNSSS	Global Navigation Satellite System
GPS	Global Positioning Satellite
HARM	High-Speed Anti-radiation Missile
ICAO	International Civil Aviation Organization
ICBM	Inter Continental Ballistic Missile
ICJ	International Court of Justice
IGY	International Geophysical Year
IRBM	Intermediate Range Ballistic Missile
J. Air L. & Com.	Journal of Air Law and Commerce
LOAC	Law of Armed Conflict
LTBT	Limited Test Ban Treaty
MTM	Multinational Technical Means
NATO	North Atlantic Treaty Organization
NTM	National Technical Means
PAROS	Prevention of an Arms Race in Outer Space

P.C.I.J.	Permanent Court of International Justice
R.I.A.A.	Reports of International Arbitral Awards
RPV	Remotely Piloted Vehicle
SALT	Strategic Arms Limitation Treaty
SAR	Synthetic Aperture Radar
SIPRI	Stockholm International Peace Research Institute
UAV	Unmanned Aerial Vehicle
U.N.T.S.	United Nations Treaty Series
WMD	Weapons of Mass Destruction

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"You cannot go to war and win without space. ... Space warfare has begun ... and with every advantage we gain from using space systems ... comes the equally important responsibility to protect it."

Gen. Lance W. Lord, Commander, Air Force Space Command
9/14/2004[1]

Introduction

On 7 October 2001, land based bombers, carrier based strike aircraft, and ship and submarine based tomahawk cruise missiles delivered devastating and highly precise blows against high value targets in Afghanistan.[2] These were the initial strikes of *Operation Enduring Freedom*, the military response to the September 11 2001 terrorist attacks.[3] However, the October 2001 strikes were significant for another reason. For the first time in the history of warfare the majority of the weapons used by U.S. and British forces relied on space based guidance systems to reach their targets.[4] This

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[1] "Space Supremacy", Extract from a speech delivered by General Lance W. Lord, Commander, Air Force Space Command, to the United States Air Force Association's National Air and Space Conference, Marriott Wardman Park Hotel, Washington D.C. on 14 Sep 2004, Online: - Headquarters Air Force Space Command <www.peterson.af.mil/hqafspc/50th/Speeches.asp?YearList=2004&SpeechChoice=79>

[2] "Operation Enduring Freedom and the Conflict in Afghanistan: An Update" British Parliamentary Research Paper 01/81, 31 October 2001, at 17, Online – House of Commons Library<http://72.14.207.104/search?q=cache:2XTQumFc_BcJ:www.parliament.uk/commons/lib/research/rp2001/rp01-081.pdf+enduring+freedom+initial+strikes&hl=en&client=safari>

[3] For an overview of Operation Enduring Freedom see "Operation Enduring Freedom – Afghanistan", Online - GlobalSecurity.org <http://www.globalsecurity.org/military/ops/enduring-freedom.htm>. In the aftermath of the September 11 attacks, NATO invoked Article 5 of the *North Atlantic Treaty* 4 April 1949, 1949 Can T.S. No. 7 (entered into force 24 August 1949). This had the effect of deeming the attack to be an attack on all 19 member states, triggering the treaty obligations of all members to act in collective self defence in accordance with Article 51 of the UN Charter. See "NATO's Contribution to the Fight Against Terrorism", Online - NATO <http://www.nato.int/terrorism/index.htm#a>. Canada's contribution to Operation Enduring Freedom was provided under the umbrella of Operation Apollo. Details of the Canadian contribution can be found at "Operation APOLLO", Online - Department of National Defence <http://www.forces.gc.ca/site/operations/Apollo/index_e.htm>.

[4] "Our people...Generating Combat Effects From and Through Space", A speech prepared for General Lance W. Lord, Commander, Air Force Space Command Strategic Space Conference, Qwest Center, Omaha, NE on 7 October 2004, Online - Headquarters Air Force Space Command

reflects the fact that technologically advanced states and their military forces are increasingly relying on space-based systems to support their strategic objectives. This increased reliance on space exploitation to further national interests has, for example, seen the United States move from a situation where it did not use space based systems to support the delivery of air to ground weapons during *Operation Desert Storm* in the early 1990s, to a circumstance where one quarter of all air to ground munitions delivered by U.S. air forces during the most recent Iraq conflict relied on the U.S. Global Positioning Satellite ("GPS") constellation[5] to reach their targets. These numbers are reflected in the following table prepared by the Washington based Centre for Defence Information.[6]

U.S. Reliance on Space: Air to Ground Munitions (excludes HARM)[7]				
	Desert Storm (Iraq 1991)	**Allied Force (Serbia 1999)**	**Enduring Freedom (Afghanistan 2002)**	**Iraqi Freedom (Iraq 2003)**
Unguided	210,000	16,000	8,000	9,300
	96%	70%	44%	38%
Laser/Electro Optic Guided	9300	7,000	5,000	8,600
	4%	27%	28%	35%
GPS Guided	0	700	5,000	6,600
	0%	3%	28%	27%

<www.peterson.af.mil/hqafspc/50th/Speeches.asp?YearList=2004&SpeechChoice=81>

[5] GPS is a satellite-based radio navigation system initially developed and operated by the U.S. Department of Defense (DoD). GPS consists of three segments - the satellite constellation, ground control network, and user equipment. The satellite constellation consists of 24 satellites positioned in earth orbit on six earth-centered orbital planes. The system includes six spare satellites, one in each of the orbital planes. The Global Positioning System became fully operational on July 17, 1995.

[6] Jeffrey Lewis, "What if Space Were Weaponized? Possible Consequences for Crisis Scenarios" Center for Defense Information Washington, D.C., July 2004 at 14, Online: Center for Defense Information <http://www.cdi.org/PDFs/scenarios.pdf>

While the use of precision-guided munitions by technologically advanced military forces is expected to increase into the future, military dependence on space is certainly not limited to air delivered weapons. The U.S. Army reportedly employed 100,000 precision GPS receivers during *Operation Iraqi Freedom*, making the technology available right down to the section or squad level.[8] Similarly, land, air and naval assets all rely on GPS for navigation and positioning purposes.

Militaries around the world are also utilizing both commercial and military satellite systems for weather forecasting, remote sensing and for the transmission of the vast amounts of communications data required on the modern battlefield. For example, Remotely Piloted Vehicle (RPV) technology is quickly evolving into both an effective battlefield reconnaissance system and low risk weapons delivery platform.[9] However, RPVs are highly dependent on communications satellites to carry the huge volume of data required for them to operate effectively. As noted by the Undersecretary of the United States Air Force in 2003:

> "Unmanned aerial vehicles alone are capable of saturating our current bandwidth availability. Just one Global Hawk with a full payload of sensors will have a future bandwidth requirement in excess of one gigabit

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[7] HARM is an acronym for "High-Speed Anti-radiation Missile". These missiles are designed to destroy radar-equipped air defense systems. For more information see "AGM-88 HARM", Online - Federation of American Scientists <http://www.fas.org/man/dod-101/sys/smart/agm-88.htm>.

[8] Jeffrey Lewis, "What if Space Were Weaponized? Possible Consequences for Crisis Scenarios" *supra* note 6 at 14.

[9] "Send in the drones - The Conflict in Afghanistan is a Testing Ground for Unmanned Aircraft Technology" *the Economist* (8 Nov 2001), where it is reported that the first operational use of a UAV fired missile occurred in Afghanistan in mid October of 2001. It was also reported by the BBC's on line service that the deaths of six suspected members of al-Qaeda in Yemen on 4 November 2002 were the result of a U.S. operated UAV launched missile. See "US drones take combat role", *BBC News Online* (5 Nov 2002) Online: <http://news.bbc.co.uk/2/hi/in_depth/2404425.stm>

> per second. But in future operations, just one Global Hawk won't be nearly enough. In fact, the Office of the Secretary of Defense's "UAV Roadmap" identified 57 future requirements associated with 15 related mission areas for UAVs."[10]

To put the bandwidth demands of an RPV in perspective, the 500,000 U.S. troops deployed for *Operation Desert Storm* in 1991 required a total of 100 megabytes per second of bandwidth, one tenth of what is required to operate a single Global Hawk system. In short, military reliance on space has evolved from the space-based remote sensing technology pioneered by the American CORONA program in the early 1960s to become an integral part of today's modern battlefield.[11] However, what is less clear is whether or not being an integral part of the modern battlefield inevitably leads to space itself becoming a battlefield.

Military planners and doctrine writers within the United States view the ability to exercise control over space in a conflict situation as essential for the successful conduct of future operations.[12] This raises significant technological

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[10] Remarks by Peter Teets, Undersecretary of the Air Force at the National Defense Industrial Association Space Symposium, Fairfax, Va., Feb. 26, 2003, Online - Find Article <http://www.findarticles.com/p/articles/mi_m0PDU/is_2003_Feb_26/ai_107122931>.

[11] The CORONA system proved successful on its 14th mission providing the United States with its first images from space on 18 August 1960. Exposed film was dropped in an enclosed capsule that was supported by parachutes as it fell through the atmosphere. The capsule was recovered during its descent to the surface by aircraft in flight. The CORONA program involved more than 100 satellite flights between 1960 and 1972, however the programs existence was not declassified until 1995. It is reported that CORONA provided more images of the Soviet Union in a single day than the entire U-2 spy plane program. The CORONA technology allowed for the cataloguing of Soviet air defense sites, antiballistic missile sites, nuclear weapons-related facilities and submarine bases. CORONA also reportedly provided imagery of the 1967 Arab-Israeli conflict and was relied upon to ensure Soviet compliance with arms control agreements. See Paul Hoversten, "CORONA: Celebrating 40 Years of Spy Satellites" *Space.com* (26 Sep 2000), Online: <http://www.space.com/news/spacehistory/nro_at_forty_000926.html> and "CORONA and Spy Satellites", Online - The Cold War Museum <http://www.coldwar.org/articles/60s/corona.html>

[12] See "Joint Doctrine For Space Operations," U.S. Department of Defence, Joint Publication 31014, August 2002, at 3-14, and "Commission to Assess United States National Security Space Management and Organization" Prepared Pursuant to Public Law 106-65, Hon Donald

questions[13] and, more relevantly for the purposes of this work, questions as to the legal framework that is applicable to the use of force in the space environment.

The use of space for military purposes and ultimately the possibility of space becoming a theatre for conflict appears, on its face, to be in sharp contrast to the publicly stated views of peaceful uses and purposes espoused by the world community, particularly the nascent space powers, at the dawn of the space age.[14] The principles of peaceful purposes articulated in the late 1950s were subsequently incorporated into the United Nations General Assembly's 1963 Declaration of "Legal Principles Governing the Activities of States in the Exploration and use of Outer Space"[15] and, ultimately, into the preamble of the 1967 Outer Space Treaty.[16] The principles contained in the Outer Space Treaty and, subsequently, in the 1979 Moon Treaty[17] have led many to argue that space militarization generally, and weaponization specifically, is inconsistent with the purpose and intent of these international

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H. Rumsfeld, Chairman (11 January 2001) at 55. (Hereinafter the "Space Commission Report").

[13] The use of space to support military operations saw its first real test in the Persian Gulf war, where space based assets were relied on for targeting, communications, early warning, mapping, intelligence collection and meteorological services. See "Final Report to Congress: Conduct of the Persian Gulf War" United States, Department of Defence (Washington D.C., April 1992), at 177. See also Hoversten "Law Governing Aerospace Warfare in the Twenty-First Century" (LL.M. Thesis, McGill University, 2000), where, in Chapter II, the author discusses in some detail the technologies tested and relied upon by coalition forces in the Persian Gulf War.

[14] D. Eisenhower, "The Historical Context", January 13 1958, letter to Nikolai Bulganin, Chairman, Council of Ministers, USSR, Online - The Eisenhower Institute <http://www.eisenhowerinstitute.org/programs/globalpartnerships/fos/newfrontier/letters.htm>, where the then President wrote ""I propose that we agree that outer space should be used only for peaceful purposes. We face a decisive moment in history in relation to this matter... Should not outer space be dedicated to the peaceful uses of mankind and denied to the purposes of war?"

[15] Resolution 1962 (XVIII). U.N. Doc. A/C.1/L.331 (1963)

[16] *Treaty on Principles Governing Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies* 27 January 1967, 1967 Can T.S. No. 19; 610 U,N,T.S. 205 (In force 10 October 1967) (hereinafter the "Outer Space Treaty").

[17] *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies* 18 December 1979, 1363 U.N.T.S. 7 (in force 11 July 1984) (hereinafter the "Moon Treaty').

legal instruments.[18] Others have taken the view that although international space treaties contain express limits with respect to certain weapons and activities in space, these limitations are relatively narrow. As a result, it is argued that states possess the legal option to deploy space-based weapons systems and to use force in, from, and through space, so long as the use of force in such a circumstance complies with international law and the Charter of the United Nations.[19]

The purpose of this thesis is to examine the legal framework applicable to the use of force in the space environment. Chapter One will seek to provide some context for the ensuing discussion by providing a brief overview of the human journey into space and how the military has taken advantage of space. Chapter Two will then discuss the international legal regime governing outer space, examine the principle of "peaceful purposes" as it relates to the uses of outer space and assess what, if any, impact the peaceful purposes principle has on military activities in space. Chapter Three will focus on the legal issues that would arise in the event a state were to consider the use of force in the outer space environment, with the focus being the authority in international law to resort to force.

Finally, Chapter Four of the thesis will focus on the future military uses of space and whether both weaponization and armed conflict in space are inevitable developments. Experience has demonstrated the significant advantages space technology provides in the pursuit of national interests, whether they be security related or otherwise, but it has also demonstrated

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[18] See *infra* Chapter Three for a full discussion of the competing views on the legal authority to use force in the outer space environment.
[19] *Ibid.*

how vulnerable space-based systems are to interference and destruction. [20] Will the need to safeguard these strategically vital national assets require the deployment of space based weapons systems, or are there other means of accomplishing the ultimate objective of security in space? It will be suggested in Chapter Four that weaponization is only one of a number of options that needs to be considered.

Space has undoubtedly become a strategic "centre of gravity"[21] for many in the international community, but how nations best safeguard their interests in space must remain open for debate.

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[20] Scientific American reports in an April 14, 2003 article that GPS jamming activity was undertaken by Iraqi forces during the Iraq war in an attempt to degrade the accuracy of weapons systems targeting areas in and around Baghdad. While the report indicates that U.S. Forces were able to deal with the jamming relatively easily and effectively, Iraqi jamming activity served to highlight the vulnerability of the GPS system to degradation during conflict, and, in turn, highlights the vulnerability of other critical space based systems. The same article reports that the dependency of ground forces on GPS was highlighted in August 2000, when the U.S., Britain and France were competing for a $1.4-billion Greek contract to supply tanks. As each country's tank entry demonstrated its capabilities to Greek officials, it became clear that U.S. and British tanks could not acquire a GPS signal for navigation. It was later reported by the journal *Military Review,* that French agents were remotely activating small, one-foot-high GPS jammers to disrupt the GPS signal when British and U.S. tanks were in the field. See Frank Vizard, "Safeguarding GPS - Attempts to Jam U.S. GPS Based Weapons and Navigation Systems in Iraq were a Reminder of Just How Vulnerable the Technology is" *Scientific American* (14 Apr 2003) Online: <http://www.sciam.com/article.cfm?articleID=00079DD3-DAA0-1E96-8EA5809EC5880000&ref=sciam>."

[21] Canadian Forces Doctrine discusses "centre of gravity" as being that aspect of total capability that, if attacked and eliminated or neutralized, will lead either to inevitable defeat or the wish to sue for peace through negotiations. It is more generally defined as "that characteristic, capability or locality from which a force, nation or alliance derives its freedom of action, physical strength or will to fight." See Canadian Forces Publications - *Conduct Of Land Operations - Operational Level Doctrine For The Canadian Army (English),* B-GL-300-001/FP-000 Page 38, Chapter 3, Paragraph 24 and *Canada's Army,* B-GL-300-000/FP-000 Chapter 5, Page 104.

Chapter I Reaching for Outer Space

Space has attracted the attention of mankind for tens of thousands of years. Ancient civilizations developed calendars based on the movements of celestial bodies, future events were predicted based upon the stars that were visible in the night sky and, the legendary Tower of Babylon was built with the goal of allowing man to reach into the heavens.[22] However, it was not until October 4 1957, that man's dreams of reaching into the heavens were first realized. On that date, the Soviet Union proudly announced to the world that it had succeeded in placing the world's first artificial satellite in orbit around the earth. No larger than a basketball and weighing 183 pounds,[23] Sputnik 1 marked the start of the space age, the space race and, many would argue, the intensification of the terrestrial arms race between the two world powers at the time, the Soviet Union and the United States.

The Soviet's initial success with Sputnik 1 was quickly followed by the launch of Sputnik 2 in November 1957, carrying the first living creature into

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[22]"The Planet Earth: Ancient Astronomy Calendars, Navigation, Predictions," Online - Space Today Online <http://www.spacetoday.org/SolSys/Earth/AncientAstronomy.html>

[23] In 1952, the International Council of Scientific Unions, in response to projections of high levels of solar activity between July 1957 and Dec 1958, declared that July 1957 until Dec 1958 would be the International Geophysical Year. The purpose of the IGY was to conduct a comprehensive series of global geophysical activities during this period. Although representatives of 46 countries originally agreed to participate, by the end of the IGY, 67 countries had become involved. One of the key activities pursued as part of the IGY arose out of a resolution adopted in October of 1954 by the Council calling for the launch of artificial earth satellites to map the earth's surface during the IGY. Both the U.S and the Soviet Union pursued this goal. The American program experienced difficulties, reportedly due to President Eisenhower's direction forbidding the use of military boosters. See Paul B. Stares " U.S. and Soviet Military Space Programs: A Comparative Assessment" K.N. Luongo & W.T. Wander ed. *The Search for Security in Space* (Ithaca, NY: Cornell University Press, 1989) at 26, where Stares states that "President Dwight D. Eisenhower's decision to forbid the use of military boosters for the IGY program led to the disastrous choice of the Vanguard, a small and relatively underdeveloped launch vehicle. Had the Eisenhower administration chosen the more advanced Army Obiter project, with its Redstone (later Jupiter) rocket, the United States would have been the first country to place a satellite in orbit."

orbit, a dog. In April of 1961, the Soviets achieved another first, placing Yuri Gagarin, the first human in orbit.[24] The Americans followed one month later, with Alan Shepard becoming the first American in space as part of the Mercury Program.[25] The American success in putting a human into earth orbit, coupled with the public accomplishments of the Soviet space program[26] led to the most dramatic development in the space race of the early 1960s, the announcement by the then President of the United States, John F. Kennedy, that the Americans would put a human being on the moon before the end of the decade.[27]

In the almost 60 years since Sputnik 1, space has been used as a tool to enhance national prestige, promote national security, pursue commercial and scientific opportunities and most recently, through the International Space Station, to actively promote international cooperation.[28] The significant advances made in the space environment in the last fifty years, however, find their roots in the development of the modern rocket during the first half of the twentieth century. The work of men such as Robert Goddard, who developed the first successful liquid fuelled rocket,[29] and Wernher von Braun, who

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[24] For an overview of the Soviet space program see Ronald D. Humble, *The Soviet Space Programme* (London: Routledge, Chapman and Hall, 1988).
[25] T.A. Heppenheimer, *Countdown A History of Space Flight* (New York: John Wiley & Sons, 1997) at 195.
[26] *Ibid* at192.
[27] "I believe this nation should commit itself to achieving the goal before the decade is out of landing a man on the moon and returning him safely to earth." "J.F. Kennedy, Special Message to the Congress on Urgent National Needs, May 25 1961", Online - John F. Kennedy Library and Museum <www.jfklibrary.org/j052561.htm>
[28] *Agreement Among the Government of Canada, Governments of Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation and the Government of the United States of America concerning Co-operation on the Civil International Space Station,* 29 January 1998, (entered into force 27 March 2001). See Article 1, which states in part that "The object of this Agreement is to establish a long-term international cooperative framework among the Partners...".
[29] T.A. Heppenheimer, *Countdown A History of Space Flight, supra*, note 25 at 31, where the author notes that Goddard successfully launched the first liquid fuelled rocket in 1926, five years earlier than the Germans and seven years before the Russians.

worked for the ruthless Nazi regime, led to the development of the first ballistic missile.[30] Their work not only made space accessible, but also closely linked rocket development and access to space with military uses. This linkage has remained firmly in place throughout the cold war and beyond.[31]

1.1 The Race to Space

Military use of rocket technology is not new, or even recent. In fact, some authors suggest that the Chinese may have developed rockets for use in warfare as early as 3000 B.C.,[32] while others suggest that the first military use of rockets did not occur until the thirteenth century.[33] The British reportedly first encountered military use of the technology in India in 1750,[34] and developed their own rocket capability subsequent to this. Nineteenth century improvements in artillery technology soon rendered the rocket, with its limited range and accuracy, obsolete.[35]

While interest in rocket technology continued, it was not until well after World War I, with the successful use of liquid fuels by John Goddard in 1926 and renewed scientific interest in Russia, Germany and to a lesser extent the United States that significant advances were made in rocketry development.[36] The German Army also became interested in rockets in the late 1920s, seeing

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[30] *Ibid* at 15.
[31] William J. Durch and Dean A. Wilkening, "Steps into Space" W.J. Durch, ed., *National Interests and Military Use of Space* (Cambridge: Ballinger Publishing, 1984) 14 and 18. Also see Calvin J. Hamilton, "A Brief History of Rocketry," Views of the Solar System, Online: <http://www.solarviews.com/eng/rocket.htm> for a detailed overview of the history of rocketry.
[32] Robert A. Ramey, "Armed Conflict on the Final Frontier: The Law of War in Space" (2000) 48 A.F.L.Rev. 1 at 7, citing N.M. Matte, *Space Activities and Emerging International Law* (Montreal: McGill University, Centre for of Air and Space Law, 1984).
[33] William J. Durch and Dean A. Wilkening, "Steps into Space", *supra* note 31 at 17.
[34] *Ibid* at 17, where the author notes that the Indians used rockets to spook cavalry.
[35] *Ibid* at 17.
[36] The published work of Herman Oberth in 1923, *The Rocket into Interplanetary Space*, is described by Durch as "a seminal work that led to the founding of rocket societies in Germany, the United States, Britain, and Russia." *Ibid* at 17.

them as a potential substitute for heavy artillery, and commenced funding a small rocket program as early as 1929.[37]

In 1932, the German Army established its own in-house rocketry program, hiring 20-year-old Wernher von Braun as the programs top civilian specialist.[38] This team successfully flew two rockets to an altitude of one mile in 1934. In March of 1936, they began work on what was designated the A-4, but would ultimately become known as the V-2 rocket. The V-2 was to be capable of carrying one ton of explosives up to 160 miles. Von Braun saw his first success with this new rocket in October 1942, with a test launch from Peenemunde on the Baltic coast. This test rocket achieved an altitude of 66 miles and a range of 118 miles.[39] Work continued on the V-2, which shortly thereafter was rushed into production as the war began to turn against Germany. The first V-2 rockets entered service in September 1944, with the Germans successfully launching in excess of 3,200 of them prior to Germany's defeat.[40]

The end of the war in Europe saw the Americans and the Soviets racing to acquire German rocket technology and expertise for use in their own programs. Wernher von Braun and his team were found behind American lines at the end of the war and most of the German team subsequently agreed

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[37] T.A. Heppenheimer, *Countdown A History of Space Flight supra* note 25 at 11 states "The Treaty of Versailles...had placed stringent limits on the size of Germany's army and on its weapons. This Treaty had forbidden the country to produce heavy artillery ...[b]ut it carried no prohibition against rocket research."

[38] *Ibid* at 15.

[39] In retrospect this feat is quite remarkable. In less than six years, von Braun and his team had succeeded in developing a powerful 25 tonne thrust engine, a workable aerodynamic design, an inertial guidance system and a radio transmission system. It is however important to remember that slave labour was a key part of the Nazi rocket program and taints these early achievements.

[40] Accuracy was a problem for the V-2, with an average targeting error in excess of 10 miles. However, it could not be defended against and as such proved to be an effective "terror" weapon. The effectiveness and potential of the V-2, even with its primitive guidance system became much more evident with the advent of the atomic bomb and its enormous destructive power in the summer of 1945.

to work in the American rocketry program.[41] Both countries acquired V-2 rockets and incorporated the technology into their rocket programs. The Americans used German V-2s as sounding rockets[42] to conduct scientific research,[43] and the Soviet Union actually put the V-2 back into production, relying on the remnants of the German program to support this effort.

In 1949, the Soviets tested their first atomic bomb. The only means available to the Soviet Union to deliver this devastating weapon was by manned bomber, an area of technology where the American capability was well ahead of the Soviets. As such, the Soviet Union placed much greater emphasis on the development of a rocket with sufficient range to deliver a nuclear weapon to North America. This is not to say that the Americans were not pursuing long-range rockets. The Americans were running a number of parallel projects with, for example, von Braun and his team developing the Redstone rocket. The Redstone was designed to carry a nuclear weapon but its range was not a significant improvement over what had been achieved with the V-2, designed to fly 200 miles.[44]

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[41] Hitler had ordered von Braun and his team executed in the closing days of the war, however the team managed to make contact with advancing American forces and subsequently moved to safety behind American lines. See "A Brief History of Rocketry", *supra* note 31

[42] Sounding Rockets derive their name from the nautical phrase "to sound" which means to take measurements. A sounding rocket is a two-part rocket; a solid fuelled rocket motor and the payload, normally scientific instruments. Sounding rockets travel vertically both into and out of space with their total time in space limited to a 5 – 20 minute period. They are ideal for carrying out research in the upper atmosphere and lower space, typically 80 – 160 Kms above the earth. "General Information on Sounding Rockets" Online - German Space Operations Centre <http://www.gsoc.dlr.de/moraba/sounding_rockets.htm>, "NASA Sounding Rocket Program Overview", Online - National Aeronautic and Space Administration <http://rscience.gsfc.nasa.gov/srrov.html> and "Sounding Rocket", Online - Encyclopædia Britannica Online <http://www.eb.com/>

[43] The V-2 was not particularly well suited to this task, as it needed a one tonne load for the guidance system to function properly. This was much more weight than required for the scientific instruments being launched meaning that ballast had to be added, limiting the maximum altitude the rocket could attain.

[44] The Redstone/Jupiter rocket was in fact used in 1958 to launch America's first satellite and again in 1961 to put Alan Shephard in orbit.

By the mid 1950s, both nations were actively pursuing an Intercontinental Ballistic Missile (ICBM) capability, the Americans developing the Atlas and Titan rockets and the Soviets, the R-7.[45] On August 21 1957, the Soviets successfully launched the R-7 ICBM achieving a range of 4000 miles, repeating the feat again in September. The Soviets now had both the means of delivering a nuclear weapon to North America and a vehicle to allow them to enter outer space. The American Atlas rocket did not successfully fly until September 18 1958, however, the Americans had successfully flown two intermediate range ballistic missiles (IRBM), which, if based in Europe, were capable of striking the Soviet Union.[46]

The race to develop a functioning ICBM was not driven solely by the perceived need to have a long-range ballistic weapons delivery system. The goal of placing a satellite in orbit around the earth was also a driving force behind this technology. The Americans, who relied heavily on reconnaissance[47] to obtain information on military developments in the Soviet Union, recognized the significant advantages that could be obtained from the vantage point of space. They also realized that the lawful use of reconnaissance satellites depended upon the establishment of the principle of "freedom of space"; a principle the Americans expected the Soviets to object to.[48] In 1954, the Americans and the Soviets both undertook to put a satellite

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[45] In addition to ICBM capability, both nations were also developing a cruise missile capability, which they abandoned when satisfied that the ICBM technology would succeed. See T.A. Heppenheimer, *supra* note 25 at 86.

[46] The Atlas had failed in June and September of 1957. However the Americans had successfully launched two Intermediate Range Ballistic Missiles, the Jupiter and the Thor, achieving ranges of 1400 and 1250 miles respectively in May and June of 1957.

[47] The Americans relied primarily on clandestine photo reconnaissance flights over Soviet territory to gather information on Soviet military activities throughout the 1950s.

[48] T.A. Heppeheimer, *supra* note 25 at 91, notes that a Rand researcher identified the problem in a 1950 report, noting that the Soviet's would view orbiting cameras as a significant threat and perhaps even a form of aggression triggering a military reaction. As a means of

in orbit as part of the 1957-58 International Geo-Physical Year. The Soviet's intent was to use the R-7 rocket to accomplish this feat, but the Americans chose to develop a "scientific" launch vehicle rather than rely on the more advanced "military" rockets under development. Many cite the decision not to rely on von Braun's Redstone/Jupiter rocket as the reason for the American failure to be first into space.[49] This is probably correct, however, historian Walter McDougall suggests that this was a strategic decision intended to ensure that the Americans would succeed in establishing the "freedom of use" principle:

> "If being first was the primary consideration in U.S. satellite policy, the DoD could have overridden its advisory committees. But speed was *not* the primary consideration; in the end, assuring the strongest civilian flavour in the project was more important. The administration was advised of the propagandist value of being first into space. Of all these critical policy areas, however, the last had the lowest priority. For there were two ways the legal path could be cleared for reconnaissance satellites. One was if the United States got away with a small initial satellite – and had no one object to it. The other was if the Soviet Union launched first.
>
> The second solution was less desirable, but it was not worth taking every measure to prevent."[50]

On October 4 1957, the Soviets won the race into space, using a launcher developed to deliver weapons halfway around the world. However,

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minimizing the risk it was suggested that the first satellite launched be a small experimental satellite placed in an equatorial orbit. This would ensure avoidance of Soviet territory and, coupled with the scientific as opposed to military nature of the satellite, would reduce the likelihood of any protest. Absence of protest would provide a precedent for the "freedom of space" principle.

[49] Paul B. Stares, *supra* note 23.

[50] T.A. Heppeheimer, *supra* note 25 at 91, citing Walter McDougall, *The Heavens and Earth: A Political History of the Space Age* (New York: Basic Books, 1985) at 123-124. See also Heppenheimer at 92 where he states "...but no one could deny that if Russia launched the first such satellite, it would immediately establish the principle par excellence. To the degree that Soviet security indeed demanded thoroughgoing secrecy, the achievement might actually undercut that security, even while winning worldwide renown. This in fact would happen, though the events would take more than a decade to play themselves out."

the Americans, whether by design or accident, were well positioned to advance their "freedom of space" position and soon followed the Russians into space in January of 1958.[51]

The history of rocket development and the race into space is inextricably linked to the development of ballistic missiles and the military uses of space. If one accepts the thesis that the freedom principle was the overriding American concern at the dawn of the space age, as put forward by McDougall and Heppenheimer, then even the desire to promote civilian and scientific uses of space was, at least in part, simply a means of ensuring the potential military advantages of space would not be jeopardized by early objections to the freedom of satellite over flight.[52] Whatever the underlying intentions, it was not long before space was being exploited for military purposes.

1.2 Military Uses of Space

On 1 May 1960, Francis Gary Powers, piloting an American U-2 spy aircraft was shot down over the Soviet Union while on a photo reconnaissance mission for the CIA.[53] The loss of the aircraft signalled the end of deep over flight missions of the U.S.S.R., depriving the Americans of their only source of photographic imagery of the Soviet Union.[54] Three months later, this gap was filled as the Americans successfully recovered the first reconnaissance

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[51] After the Soviet Union successfully placed two satellites in orbit, the U.S. used von Braun's Redstone/Jupiter rocket to launch its first satellite, Explorer I.

[52] See *infra* Chapter Two, which discusses the role of state practice in the development of customary international law.

[53] O Caruthers, "Confession Cited – Krushchev Charges Jet was 1,200 Miles From the Border" *The New York Times* (8 May 1960) 1

[54] T.A. Heppeheimer, *supra* note 25 at 143 and Frederick J. Ferrer, "The story of the Impact of U.S. Aerial Reconnaissance during the Early Cold War (1947-1962): Service & Sacrifice of the Cold Warriors" Online: < http://www.rb-29.net/HTML/77ColdWarStory/00.25cwscvr.htm> Annex D.

photographs taken by an orbiting satellite. This single mission provided the Americans with more imagery of Soviet territory than had been produced by all of the previous U-2 over flights combined.[55] This marked the beginning of the use of space for military and national security purposes. The Soviets followed two years later launching their first photo reconnaissance satellite in April 1962.[56]

While the first military uses of space were for photographic purposes, military uses of space have evolved well beyond this in the last 40 plus years. A large, and growing, number of nations rely on space-based assets to support their military activities.[57] The major military uses of space are discussed briefly in the following sections.

1.2.1 Reconnaissance Satellites

Reconnaissance, or remote sensing satellites are the most common and widely used satellites in support of military activities. They perform a number of different functions. In some instances, these remote sensing satellites are dedicated solely to military activities and operated by military or

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[55] This was the first successfully operated CORONA satellite but was the 14th launch, for more information see *supra* note 11.

[56] Bhupendra Jasani (SIPRI), *Outer Space – Battlefield of the Future* (London: Taylor & Francis Ltd. 1978) at 36.

[57] Space based commercial remote sensing systems are currently being operated by Brazil, Canada, China, France, India, Japan, Taiwan, the United States and the European Union. "Earth Observation Satellites: Current", Online - Environmental Remote Sensing Center, <http://www.ersc.wisc.edu/resources/EOSC.html> The European Space Agency includes 16 member states, Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom. Canada, Hungary and the Czech Republic participate in some projects under cooperation agreements "ESA facts and figures," Online - European Space Agency <http://www.esa.int/esaCP/GGG4SXG3AEC_index_0.html>. Bhupendra Jasani, "Military Uses of Outer Space" 2002, XXVII Ann. Air & Sp. L. 347 at 353 notes that there has been a "considerable improvement in the quality of civil remote sensing satellites. For example, over the last three decades the capabilities of the civil remote sensing satellites have increased some 130 times, with the current best resolution 0.61m. It is now possible to purchase images acquired by various countries."

national security agencies. In other cases they are a dual use resource,[58] performing both military and national security functions, and civil/scientific functions.[59]

Imaging satellites employ either optical sensors, or use imaging radar to capture pictures of the earth's surface. Systems using imaging radar are referred to as synthetic aperture radar (SAR) systems. SAR systems are capable of functioning at night, through cloud cover, and also have an ability to penetrate into an object.[60] Dedicated military imaging systems are reportedly capable of achieving resolutions of 10 centimetres or better.[61] Imaging satellites are used for a variety of purposes including mapping, intelligence collection, target identification and battle damage assessment.[62]

Signals intelligence satellites are the second category of reconnaissance satellites. They are designed to detect electronic transmissions from a broad range of broadcasting devices including communications systems and radar. These systems can detect very low power transmitters and are capable of identifying the type and location of transmitter being detected. The United States reportedly operates four different constellations of signals intelligence satellites, allowing for the interception and analysis of information passed over

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[58] The Canadian Synthetic Aperture Radar Satellite, RADARSAT II, expected to be launched in 2005, will be a privately owned and operated system, licensed by the Government of Canada. Under the terms of proposed legislation the operator of the system will be required to provide priority access to the Government of Canada in defined circumstances. See Bill C-25, *An Act Governing the Operation of Remote Sensing Space Systems*, 1st Sess., 38th Parl., 2004.

[59] See Elizabeth Waldrop, "Integration of Military and Civilian Space Assets: Legal and National Security Implications", 2004, 55 A.F. L. Rev. 157 at 168 for a detailed discussion of military/civilian partnerships in the U.S. context.

[60] Bhupendra Jasani, "Military Uses of Outer Space" *supra* note 57 at 351.

[61] "IMINT Overview", Online - Federation of American Scientists <http://www.fas.org/spp/military/program/imint/overview.htm>.

[62] *Ibid.*

wireless systems.[63]

Finally, there are reconnaissance satellite systems designed to fulfil an early warning and ocean surveillance function. Early warning satellites, used to monitor missile launches, are fitted with infrared sensors capable of detecting the heat from a rocket's engines. They allow operating states to monitor treaty compliance,[64] and provide an early warning system in the event of a missile attack. The systems are also employed in conflict situations to assist in identifying missile launch sites.[65]

Ocean surveillance satellites perform a similar function but are operated in groupings of three satellites. This allows for the precise pinpointing of rival naval assets and the analysis of the radar and other electronic emissions from targeted vessels.[66]

1.2.2 Meteorological Satellites

Meteorological satellites provide essential support in the conduct of military operations. They enhance forecasting capabilities, allowing military forces to adjust operational plans to react to, or take advantage of, anticipated weather conditions. They enhance the ability of forces conducting routine operations to avoid hazardous weather conditions that may place them at risk. Military forces rely on both dedicated military satellite constellations and

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[63] "SIGINT Overview", Online - Federation of American Scientists <http://www.fas.org/spp/military/program/sigint/overview.htm>.
[64] These satellites form part of the "National Technical Means of Treaty verification, discussed *infra* in Chapter 2.
[65] "Warning", Online - Federation of American Scientists <http://www.fas.org/spp/military/program/warning/overview.htm>.
[66] Roger Guillemette, "Trio of NRO Spy Satellites to be Launched During Next Two Months" *SPACE.com* (6 September 2001), Online - <http://www.space.com/missionlaunches/nro_preview_010906.html>

civilian satellites,[67] either working together or individually, to provide this enhanced weather forecasting support.[68]

1.2.3 Communications Satellites

The United States and Russia have both developed separate communication satellite systems to serve their military requirements.[69] The capacity of these dedicated systems, particularly in the case of the United States, has not been sufficient to meet the ever-increasing bandwidth needs of the military.[70] This has been due to the escalating demands for information handling capacity arising out of technological advances in the areas of battlefield situational awareness and intelligence gathering. Technology now allows for real time images and video from the battlefield to be made available to operational and strategic headquarters and, in some cases, to the soldier in the field.[71] The solution to the capacity shortage has been to rely on commercial satellite systems to supplement the capacity of military systems.[72]

While commercial systems have been relied on to support the military, the importance of communications to the conduct of military operations requires that essential links be maintained. This has made the survivability of

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[67] The Americans have developed both military and civilian satellite constellations for weather forecasting purposes, but both constellations are relied on by the military. The Russians on the other hand have deployed a single constellation. See Bhupendra Jasani, *supra* note 57 at 351

[68] Bhupendra Jasani, "Military Uses of Outer Space" *ibid* at 351. See also "Weather", Online - Federation of American Scientists <http://www.fas.org/spp/military/program/met/overview.htm>.

[69] Bhupendra Jasani, *ibid* at 352.

[70] Elizabeth Waldrop, "Integration of Military and Civilian Space Assets: Legal and National Security Implications" *supra* note 59 at 169.

[71] See, for example, *supra* note 10 and the accompanying text, which demonstrates the exponential increases in demand for communications capacity the military is experiencing. It is anticipated that demand will continue to increase as information flows both to and from the battlefield evolve from imagery and positioning information to the remote control of weapons and support systems from control centres miles away from actual combat zones.

[72] Elizabeth Waldrop, "Integration of Military and Civilian Space Assets: Legal and National Security Implications" *supra* note 59 at 169.

military communications systems particularly important. Military satellite systems have therefore been hardened to minimize the risk of interference or destruction in a period of crisis.[73]

1.2.4 Navigation/Targeting Satellites

Both the Russians and the Americans have developed satellite constellations that are used for navigation and weapons delivery purposes. The American and Russian systems, while developed and operated by the military, have been made available for civilian uses. At least in the case of the American system, signal accuracy is somewhat degraded for civilian purposes.[74] Significant reliance is placed on these systems in the conduct of military operations, but it is relatively easy to interfere with the low powered signals utilized by navigation satellite systems, making them vulnerable.[75] As noted by one author:

> "The first problem is that the GPS signal is so weak that it is regularly wiped out by natural phenomena and by other radio transmissions. And anyone with $50 and a soldering iron can buy parts from a radio store and make a jammer to destroy the GPS signal for a hundred miles."[76]

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[73] Bhupendra Jasani, "Military Uses of Outer Space" *supra* note 57 at 352. See also "Satellite Communications", Online - Federation of American Scientists <http://www.fas.org/spp/military/program/com/index.html>.

[74] The Russian system is called the Global Navigation Satellite System (GLONASS), a 24 satellite constellation, with the first satellites having been placed in orbit in 1982. See "General - GLONASS", Online - Russian Federation Ministry of Defence, Coordination Scientific Information Centre <http://www.glonass-center.ru/frame_e.html.> The American Global Positioning System (GPS) is also a 24 satellite constellation in medium earth orbit. The Europeans are also in the process of developing their own satellite navigation system, Galileo, to consist of 30 satellites (27 operational and 3 spares) in medium earth orbit. See "Navigation", Online - European Space Agency <http://www.esa.int/esaNA/GGGMX650NDC_index_0.html>

[75] See *supra* note 20 and accompanying text. Also see "The Space Commission Report" *supra* note 12 at 20.

[76] Langhorne Bond, "The GNSS Safety and Sovereignty Convention of 2000 AD" (2000), 65 Journal of Air Law and Commerce, 445 at 446.

1.2.5 Space Weapons[77]

"Space weapons" are not formally defined in international law; however, there are a number of working definitions, one of which provides:

> "A space weapon is a device stationed in outer space (including the moon and other celestial bodies) or in the earth environment designed to destroy, damage, or otherwise interfere with the normal functioning of an object or being in outer space, or a device stationed in outer space designed to destroy, damage, or otherwise interfere with the normal functioning of an object or being in the earth environment. Any other device with the inherent capability to be used as defined above will be considered as a space weapon."[78]

As the above definition demonstrates, the use of force in space does not necessarily equate to the basing of weapons either in space or upon celestial bodies. Surface and atmosphere based weapons may also be used to target space based assets. The use of force in space can therefore be accomplished through the use of ground to space, air to space, or space to space weapons systems.[79]

Research and testing of anti-satellite technology has been pursued since the early 1960s,[80] and there are numerous methods available to destroy or disable a space-based system. One of the simplest, yet most destructive options, is the detonation of a nuclear device in space. Due to the unique characteristics of the space environment, a nuclear detonation would generate an electromagnetic pulse destroying the electronic components of unprotected

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[77] See Bob Preston et al., "Space Weapons Earth Wars," (2002) Rand Publications, Online - <http://www.rand.org/publications/MR/MR1209/index.html> Chap 3, for a detailed discussion on space weapons.
[78] Bhupendra Jasani, "Introduction" ed. Bhupendra Jasani, *Peaceful and Non-Peaceful Uses of Space – Problems of Definition for the Prevention of an Arms Race* (New York: Taylor & Francis 1991) 1 at 13.
[79] *Ibid* at 10.
[80] Bhupendra Jasani (SIPRI), *supra* note 56 at 173 - 176.

satellites within several hundred miles of the explosion.[81] This capability makes all nuclear devices potential anti-satellite (ASAT) weapons.

Another common form of space weaponry is the kinetic energy weapon. These weapons rely on the tremendous speeds at which objects travel in space, particularly in low earth orbit, for their destructive power. Kinetic energy weapons do not carry explosives; they destroy target satellites simply by colliding with them.[82] Kinetic Energy ASAT weapons can be launched from any environment including space.[83] They are not favoured by the United States military because of the significant amount of orbital debris that satellite destruction would generate.[84]

Directed energy weapons, which include both laser and particle beam technology, have also been researched for ASAT purposes. The Americans have had some initial success with laser technology. Laser and particle beam systems may become the weapons of choice in the future, but much work remains to be done before either of these technologies would be effective as either an ASAT or space based weapons system.[85]

Space based weapons might also be used to target objects on the earth or in the atmosphere. Both kinetic energy weapons and directed energy weapons based in space could strike surface targets. For example, it has been proposed that rods of depleted uranium or tungsten might be based in

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[81] Robert A. Ramey, *supra* note 32 at 20
[82] *Ibid*, at 22.
[83] Bhupendra Jasani, "Military Uses of Outer Space" *supra* note 57 at 357.
[84] Elizabeth Waldrop, "Weaponization of Outer Space: U.S. National Policy" (2004) XXIX Ann. Air & Sp. L. 329 at 337, where the author notes "However, in 2001 the then head of U.S. Space Command expressed concern about using kinetic energy ASATs, since debris left in orbit from the use of these weapons could damage friendly satellites, civilian and military, belonging to the U.S. and allies."
[85] Robert A. Ramey, *supra* note 32 at 23 – 26; Bhupendra Jasani, "Military Uses of Outer Space" *supra* note 57 at 358; and, "In Test, Military Hits Satellite Using a Laser", *The New York Times* (21 Oct 1997) A18

space. These rods could then be dropped on selected targets, using a precision guidance system, relying on kinetic energy rather than explosives to cause destruction of the target area.[86]

While it is evident that much research has been done on weapons systems capable of functioning both in and from space, it appears that the space powers have avoided the actual deployment of weapons in space.[87] However, as the American Ballistic Missile Defence program advances, it is possible and, some would argue likely, that the U.S. will seek to place weapons in space.[88] Any decision to do so would rely on the current legal framework to argue that the deployment of space weapons is consistent with the permitted uses of outer space. This legal framework and the issues arising out of it will be examined in Chapters 2 and 3.

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[86] Robert A. Ramey, *supra* note 32 at 23. See also Michael Goldfarb, "The Rods from God" *The Weekly Standard* June 8, 2005, GlobalSecurity.org, Online: <http://www.globalsecurity.org/org/news/2005/050608-gods-rods.htm> where the system is described as follows "The system would likely be comprised of tandem satellites, one serving as a communications platform, the other carrying an indeterminate number of tungsten rods, each up to 20 feet in length and 1 foot in diameter. These rods, which could be dropped on a target with as little as 15 minutes notice, would enter the Earth's atmosphere at a speed of 36,000 feet per second--about as fast as a meteor. Upon impact, the rod would be capable of producing all the effects of an earth-penetrating nuclear weapon, without any of the radioactive fallout. This type of weapon relies on kinetic energy, rather than high-explosives, to generate destructive force (as do smart spears, another weapon system which would rely on tungsten rods, though not space-based)."

[87] See Thresa Hitchens, "Weapons in Space: Silver Bullet or Russian Roulette? The Policy Implications of U.S. Pursuit of Space-Based Weapons" (2002), Online - Center for Defense Information <http://www.cdi.org/program/document.cfm?documentid=2919&programID=6&from_page=../friendlyversion/printversion.cfm>, where the author states that "For nearly 40 years, there has been an unspoken agreement among the world's space powers to refrain from putting weapons in orbit."

[88] Elizabeth Waldrop, "Weaponization of Outer Space: U.S. National Policy" *supra* note 84 at 337.

Chapter 2 Space Law – The International Legal Regime

While not without controversy at the dawn of the space age, it is well accepted today that space law is not an independent legal system but rather a functional grouping of legal rules, domestic and international, that relate to outer space and human activity in space.[89] It is those rules of public international law that are of interest when addressing questions related to the military uses of space generally and the use of force in, from or through space specifically. To engage in a discussion of how regulation of the use of force might differ in the outer space environment, it is necessary to consider both the general sources of international law and the specific rules of law that are applicable to outer space activities.

2.1 General International Law

Relations between independent states are governed by international law. International legal obligations are imposed on states only where those obligations can be demonstrated to have arisen through the express or general consent of states. Whereas municipal or domestic legal systems confer binding rule making authority upon a constitutionally established body, no such body exists in the international forum. This means that the key to

[89] In his article *The Extraterrestrial Application of International Law* Bin Cheng observes "At the dawn of the space age doubt in one form or another was often expressed, not least by various Members of the United Nations, whether international law, as such was from the very beginning applicable to outer space. " Cheng subsequently notes in *Outer Space: The International Legal Framework*, that despite these early doubts "In fact, international law knows no inherent geographical limits and extends to the activities of the subjects of international law in outer space..." see Bin Cheng *Studies in International Space Law,* (Oxford, Clarendon Press, 1997) at 70 and 385.

establishing the existence of international law is evidence of a consensus among states, or a willingness to be bound.[90] With no formal law making body, international law is derived from the activities of states and flows from a number of different sources.

Article 38 of the International Court of Justice ("ICJ") Statute is generally considered as a complete statement of the sources of international law, providing:[91]

> "Article 38
>
> 1. The Court, whose function is to decide in accordance with international law such disputes as are submitted to it, shall apply:
>
>   a. international conventions, whether general or particular, establishing rules expressly recognized by the contesting states;
>
>   b. international custom, as evidence of a general practice accepted as law;
>
>   c. the general principles of law recognized by civilized nations;
>
>   d. subject to the provisions of Article 59, judicial decisions and the teachings of the most highly qualified publicists of the various nations, as subsidiary means for the determination of rules of law.
>
> 2. This provision shall not prejudice the power of the Court to decide a case *ex aequo et bono*, if the parties agree thereto."[92]

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[90] Kindred et al *International Law Chiefly as Interpreted and Applied in Canada*, 6th ed. (Canada: Edmond Montgomery Publications Ltd, 2000) at 91.
[91] Brownlie, *Principles of Public International Law*, 6th ed. (Oxford: New York: Oxford University Press, 2003.), at 5
[92] *Statute of the International Court of Justice* 24 October 1945, 1945 Can T.S. No. 7 (In force 26 June 1946) (Hereinafter the "ICJ Statute), Article 38. Note that Article 59 of the Statute provides that the decisions of the Court have no binding effect except as between the parties in respect of the particular dispute.

In order to assert a positive rule of international law, it must be demonstrated that the rule is the product of one or more of the three law making processes set out in Article 38 (1) (a) through (c) of the ICJ Statute. None of these three sources is of more import, carries greater weight, or is more authoritative than another. The existence of three equally authoritative sources of law generates both the possibility for conflicting rules of international law[93] and the situation where the same rule may be derived from more than one of the three law making sources. The issue of the same or similar obligations arising from different sources was addressed directly by the ICJ in the case of *Military Activities In and Against Nicaragua.*[94] In the Military Activities case, the Court rejected a jurisdiction argument put forward by the United States to the effect that customary rules of international law cease to exist independently after being incorporated in whole, or in part, into treaty law.[95]

2.1.1 International Conventions or Treaties

Treaties create special rights and obligations between those states that are parties to the treaty. Treaties are a key law making or creating process in

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[93] Kindred et al *International Law Chiefly as Interpreted and Applied in Canada supra* note 90 at 93, where the author notes that conflict between treaty law and customary international law is often more apparent than real and that it is rare for international tribunals to have to express a view on conflict situations. One of the exceptions is the *English Channel Arbitration* (1977), 18 R.I.A.A. 3 at 36-37, which concerned the delimitation of the continental shelf between the U.K. and France. In addressing the issue of a conflict between the treaty obligations of the parties that had arisen out of the Continental Shelf Convention of 1958 and developments in customary law ,the Court stated "But the Continental Shelf Convention of 1958 entered into force as between the parties little more than a decade ago. ... Consequently, only the most conclusive indications of intention of the parties to the 1958 Convention to regard it as terminated could warrant this Court in treating it as obsolete and inapplicable as between the French Republic and the United Kingdom in the present matter." The Court went on to state that no such evidence was before the Court.

[94] [1986] I.C.J. Rep. 14.

[95] *Ibid,* paras 175 – 179.

international law.[96] Given the consensual nature of the treaty making process, treaties are somewhat analogous to private contracts in domestic law.

Many authors draw a distinction between "law-making treaties" and "treaty contracts", with law making treaties being defined as those treaties that involve a significant number of states declaring what the law is, or should be, in a particular area.[97] Treaty contracts on the other hand create special rights and obligations as between the parties themselves but do not create general rules of international law. Martin Dixon, in his textbook on International Law, describes the distinction in the following way:

> "It is clear then, that the legal effect of treaties is identical whether we regard them as law creating or obligation creating. In all cases, a state is bound to act in accordance with the terms of a treaty to which it is a party whether we call this a 'law' or 'obligation'...In practice, a 'treaty contract' or bilateral treaty will terminate either when the particular object for which it has been drawn up has been achieved or if other unforeseen circumstances intervene. A 'law-making' or multi-lateral treaty, on the other hand, may be intended to endure and lay down rules for the conduct of states for the indefinite future. It might give rise to general customary law for all states. In other words, the distinction between the various types of treaty is not one of legal effect but of purpose and aim..."[98]

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[96] The *Vienna Convention on the Law of Treaties* defines a treaty as follows in Article 2: " "Treaty" means an international agreement concluded between states in a written form and governed by international law, whether embodied in a single instrument or in two or more related instruments and whatever its particular designation." See *Vienna Convention on the Law of Treaties*, 23 May 1969, 1980 Can T.S. No. 37; 1115 U.N.T.S. 331.

[97] Kindred et al *International Law Chiefly as Interpreted and Applied in Canada, supra* note 90 at 95. For a detailed discussion of the Law of Treaties see S. Davidison, ed. *The Law of Treaties* (Hants England, Ashgate Publishing Limited, 2004).

[98] M Dixon, *Textbook on International Law* (Great Britain, Blackstone Press Ltd. 1996) at 26.

Customary international law and, more recently, the Vienna Convention on the Law of Treaties, governs international law applicable to treaties.[99] The Vienna Convention is, of course, only binding on the state parties to the Treaty. However, as the Convention is regarded as being a "law making" Treaty,[100] many of its provisions are viewed as being a codification of previously existing customary international law. In addition, wide acceptance by states of other provisions of the Treaty has had the effect of accelerating the adoption of *de lege ferenda* (developing customary international law) in the area of international treaty law.[101]

Interpretation is frequently the subject of dispute where an international agreement is involved and, as will be discussed, is a significant issue in the area of space related treaties. Section 3 of the Vienna Convention is of particular importance, in that it sets out the rules of treaty interpretation. The relevant Articles provide:

> "Article 31 - General rule of interpretation
>
> 1. A treaty shall be interpreted in good faith in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose.

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[99] *Vienna Convention on the Law of Treaties, supra* note 96. There are currently 101 state parties to the Treaty and 45 signatories. The full text of the Treaty is available at "Vienna Convention on the Law of Treaties: Online – International Law Commission <http://www.un.org/law/ilc/texts/treaties.htm >, and the status of the Treaty can be accessed at "Vienna Convention on the Law of Treaties" Online – Canada Treaty List < http://www.treaty-accord.gc.ca/Treaties_CLF/Details.asp?Treaty_ID=104068 >

[100] Kindred et al *International Law Chiefly as Interpreted and Applied in Canada, supra* note 90 at 96 where the author cites a 1970 Canadian Government Memorandum expressing the opinion that "...the Convention must be viewed as virtually the constitutional basis, second only in importance to the UN Charter, of the international community of states.

[101] While the *Vienna Convention on the Law of Treaties* is viewed as declaratory of customary international law (see for example the advisory opinion of the ICJ in the *Namibia Case*, ICJ Reports [1971], 16 at 47 and the *Appeal Relating to Jurisdiction of ICAO Council*, ICJ Reports [1972], 46 at 67, where the court expressly recognized that the provisions relating to the termination of a treaty relationship codified existing customary law in this area) it is not, as a whole, declaratory of customary international law. Furthermore, while the Treaty deals with significant areas of international treaty law, it is not a complete codification. For example the Treaty does not address the effect of armed conflict on treaty obligations (see Article 73).

2. The context for the purpose of the interpretation of a treaty shall comprise, in addition to the text, including its preamble and annexes:

   (a) any agreement relating to the treaty which was made between all the parties in connexion with the conclusion of the treaty;

   (b) any instrument which was made by one or more parties in connexion with the conclusion of the treaty and accepted by the other parties as an instrument related to the treaty.

3. There shall be taken into account, together with the context:

   (a) any subsequent agreement between the parties regarding the interpretation of the treaty or the application of its provisions;

   (b) any subsequent practice in the application of the treaty which establishes the agreement of the parties regarding its interpretation;

   (c) any relevant rules of international law applicable in the relations between the parties.

4. A special meaning shall be given to a term if it is established that the parties so intended.

Article 32 - Supplementary means of interpretation

Recourse may be had to supplementary means of interpretation, including the preparatory work of the treaty and the circumstances of its conclusion, in order to confirm the meaning resulting from the application of article 31, or to determine the meaning when the interpretation according to article 31:

   (a) leaves the meaning ambiguous or obscure; or

(b) leads to a result which is manifestly absurd or unreasonable."[102]

Treaties are a fundamental source of International Law. State parties to a treaty are legally bound to their treaty obligations and are expected to perform these obligations in good faith.[103] This rule of *pacta sunt servanda* is essential to the functioning of the international treaty system. A state's failure to perform its international treaty obligations triggers international responsibility for that failure.[104]

2.1.2 Customary Law

Customary international law arises out of the practice and customs of states in the conduct of their affairs in the international forum. One author has described the creation of customary international law as follows:

> "It is, in other words, a process of continuous interaction, of continuous demand and response, in which the decision-makers of particular nation states unilaterally put forward claims of the most diverse and conflicting character ... and in which other decision makers, external to the demanding state and including both national and international officials, weigh and appraise these competing claims in terms of the interests of the world community and of the rival claimants, and ultimately accept or reject them. As such a process, it is a living, growing law, grounded in the practices and sanctioning expectations of nation state officials, and changing as their demands and expectations are changed by the exigencies of new interests and technology and by other continually evolving conditions in the world arena..."[105]

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[102] *Vienna Convention on the Law of Treaties*, *supra* note 96, Articles 31 and 32.
[103] *Ibid,* Article 26.
[104] Richard K. Gardiner, *International Law*, (Great Britain: Dorset Press, 2003) 436 – 437.
[105] M.S. McDougal, "The Hydrogen Bomb Tests and the International Law of the Sea" (1955), 29 Am. J. Int. L. 356 at 357. In this article the author is discussing customary law in the context of the law of the sea however his observations are of general application.

The existence of a rule of customary law is dependant upon the existence of two separate and distinct elements. The first is a practice or usage that involves a rule of conduct. The second is referred to as *opinio juris*, or the belief on the part of states that the practice or usage in question is binding. Thus, for the *opinio juris* element to be satisfied, it must be demonstrated that states are following a practice or usage out of a belief of obligation, rather than simply for reasons of convenience or practicality.[106]

The general practice required to establish customary law can be shown to exist through any number of means, including actual state activity, statements made in response to concrete situations, statements of legal principle, national legislation or policy decisions, domestic judicial decisions, etc.[107] However, it is not enough to simply establish a practice, one must also establish that the practice has been constant and uniform among states.[108] Complete uniformity is not required but substantial uniformity of practice must be shown.[109] In addition to uniformity, there is a requirement for the practice to be common among a significant number of states. Again it is not necessary to show that all states have followed the practice, but there must be widespread use, with the degree of "generality" depending on the nature of the practice in question. When considering generality of practice, notice will be taken of the position of those states having a special interest in the specific

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[106] Brownlie, *Principles of Public International Law, supra* note 91 at 8.
[107] See Dixon *Textbook on International Law supra* note 98 at 28. See also Brownlie, *Principles of Public International Law, ibid* at 6, where evidence of practice is discussed and the author notes "The material sources of custom are very numerous...Obviously the value of these sources varies and much depends on the circumstances".
[108] See the *Asylum Case*, ICJ Reports (1950) 276 where the court states that the party relying on custom must prove "constant and uniform" usage of the practice.
[109] See for example the *Fisheries case*, ICJ Reports (1951), 116 at 131 where the court acknowledged "although the ten mile rule has been adopted by certain states both in their national laws and their treaties ... other states have adopted a different limit." Due to this absence of uniformity of practice, the court held that the rule in question was not customary law

area of international law. For example, the practice of costal states where the law of the sea is in issue, or that of space faring nations where space law questions arise, will be of particular interest to a court or tribunal in determining whether or not a specific practice has acquired the status of customary international law.[110]

Finally, there is the issue of time. How long must a usage be uniform and general before it ripens into customary international law? The answer is that there is no minimum time limit. The passage of time will support arguments of generality and uniformity, but a very short period of time will not preclude a finding in favour of a rule of customary international law. In fact, some writers have argued that instant customary international law can arise from a single act.[111] One author has noted that "In the formation of customary space law, the essential criteria, apart from acceptance, is not time but context."[112]

The elements that must exist before finding a rule of customary law were set out in the *Lotus case*[113] as follows:

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[110] *North Sea Continental Shelf Case* [1969] I.C.J. Rep. 3 where the court refers to states, "whose interests are specially affected".

[111] M Dixon, *Textbook on International Law, supra* note 98 at 30, and Cheng, *United Nations Resolutions on Outer Space: 'Instant" International Customary Law? supra* note 89 at 136 where the author discusses the question of instant international law, noting that the issue most frequently arises in the context of UN General Assembly Resolutions where the resolution sets out principles of international law and is adopted unanimously. In such cases it is argued that the Resolution actually reflects the required *opinio juris*, thereby allowing for a finding of customary law in respect of the stated principles. Pursuant to this argument one may, at least theoretically, find customary law to exist absent any usage, relying solely on the *opinio juris* as reflected by the unanimously adopted resolution. This argument is of particular interest and relevance in the area of space law, where for example the General Assembly has passed a number of resolutions addressing questions of space weaponization, the most recent being *Prevention Of An Arms Race In Outer Space*, 17 December 2004, U.N. Doc A/Res 59/65, which was adopted 178 votes to none, with four abstentions. One of the four abstaining states was the United States.

[112] Bruce A. Hurwitz, *The Legality of Space Militarization* (Amsterdam: Elsevier Publications, 1986), p. 7.

[113] *Lotus Case*, PCIJ [1927] Ser. A No. 10

> "The ascertainment of a rule of international law implies consequently an investigation of the way in which customs acquire consistency and thus come to be considered as constituting rules governing international relations. A series of definitions tend to fix the elements necessary for the establishment of an international custom. There must have been acts of State accomplished in the domain of international relations, whilst mere municipal laws are insufficient; moreover, the foundation of a custom must be the united will of several and even of many States constituting a union of wills, or a general consensus of opinion among the countries which have adopted the European system of civilization, or a manifestation of international legal ethics which takes place through the continual recurrence of events with an innate consciousness of their being necessary. These different theories give a general idea of the necessary conditions for the existence of an international law and they show the necessity of some action ("acts", "will", "agreement") on the part of States, without which a rule of international law cannot be based on custom."[114]

The evolving nature of customary international law is one of its major strengths but also one of its weaknesses. The terms "state practice", "custom", and "usage" are all difficult terms to define and, their meaning is undoubtedly influenced by perspective and circumstances. This coupled with the difficulties in identifying *opinio juris* often leaves the question of what is and is not a custom or practice open to debate and disagreement. This is particularly so in areas of developing international law, such as space. In relative terms, there is not a long history of state activity in space and stated positions and principles do not always appear to be reflective of actual state practice.[115]

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[114] *Ibid* at 38. Quoted from the dissenting opinion of Judge M. Nyholm. While from one of the dissenting judgements, there does not appear to have been any disagreement on the Court with respect to the formal criteria required to establish a rule of customary international law.

[115] A determination that a particular practice has ripened into customary international law will have the effect of binding all states, presumably on the theory of implied acceptance of the

2.1.3 General Principles of Law

The final source of international law identified in Article 38 of the ICJ Statute is "general principles of law recognized by civilised nations".[116] This source has generated a great deal discussion for two primary reasons. Firstly, there has been much debate over the meaning of the term "civilised nations"[117] and, secondly, contrary to the principle of state sovereignty, this source suggests that international law may develop outside the sphere of state control.[118]

A variety of different meanings have been attributed to the phrase "general principles of law recognized by civilised nations", but the most widely accepted interpretation holds that Article 38(1)(c) refers to rules and principles that are common to all well developed legal systems.[119] This includes such notions as the right of parties to a dispute to have access to independent arbitrators, the right to be heard before a decision is made etc.. Judge McNair, in the *International Status of South West Africa Case* interpreted Article 38(1)(c) as follows:

> "...it will be noted that this article authorizes the Court to "apply...(c) the general principles of law recognized by civilized nations." The way in which international law borrows from this source is not by means of importing private law institutions "lock stock and barrel," ready made and fully equipped with a set of rules. It would be difficult to reconcile such a process with the application of "the general principles of law." In my opinion the true view of duty of international

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practice and its binding nature. The one exception to this presumption that all states are bound by established customary international law is the notion of "persistent objector". States will not be bound by a rule of customary international law if the state can clearly demonstrate that it consistently objected to the customary rule during the process of its formation. See Brownlie, *Principles of Public International Law, supra* note 91 at 11.

[116] *Statute of the International Court of Justice, supra* note 92, Article 38(1)(c).

[117] M Dixon, *Textbook on International Law, supra* note 98 at 36.

[118] *Ibid*, at 36.

[119] *Ibid*, at 37.

> tribunals in this matter is to regard any features or terminology which are reminiscent of the rules and institutions of private law as an indication of policy and principles rather than as directly importing these rules and institutions."[120]

2.2 International Space Law

Space law was born in 1957, with the entry of humankind into this new region of activity. However, this is not to say that the world entered into the space age in a complete legal vacuum. As early as the 1920s, papers addressing space law issues were published.[121] In 1932, the "father of space law", Vladimir Mandl published the first comprehensive work on legal issues relating to space.[122] Human activity in space did, however, spur the development of space law, with the United Nations General Assembly establishing the *AD Hoc* Committee on the Peaceful Uses of Outer Space (COPUOS) in 1958.[123]

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[120] Adv. Op. (1950) I.C.J. Rep. 128. Judge McNair wrote a separate opinion in this case.
[121] Bruno Philipp Besser, *Austria's History in Space* (The Netherlands: ESA Publications Division, 2004) at 14, Online: <http://www.esa.int/esapub/hsr/HSR_34.pdf>
[122] Nandasiri Jasentuliyana, "Space Law: The Newest Branch of International Law", XXII-I Ann. Air & Sp. L. (1997) 343 at 345. Also see Bruno Philipp Besser, *Austria's History in Space ibid* at 14. Mandl's monograph is titled *Das Weltraumrecht: ein Problem der Raumfahrt* (Mannhiem: J. Bensheimer, 1932) or, *The Law of Outer Space: a Problem of Space-Flight.* In this monograph, Mandl advocated for an independent branch of law to address space, governed by principles from both the law of the sea and the law of the air. Mandl also rejected the notion of sovereignty in space. See also Stephen Doyle, *Origins of International Space Law and the International Institute of Space Law of the International Astronautical Federation* (San Diego: Univelt, Incorporated, 2002).
[123] COPUOS was initially established as an eighteen member *ad hoc* committee. In 1959, its membership was enlarged to 24 members and it was established as a permanent committee. In 1961 COPUOS membership was expanded to 28 members and today membership stands at 67 - Albania, Algeria, Argentina, Australia, Austria, Belgium, Benin, Brazil, Bulgaria, Burkina Faso, Cameroon, Canada, Chad, Chile, China, Colombia, Cuba, Czech Republic, Ecuador, Egypt, France, Hungary, Germany, Greece, India, Indonesia, Iran, Iraq, Italy, Japan, Kazakhstan, Kenya, Lebanon, Libyan Arab Jamahiriya, Malaysia, Mexico, Mongolia, Morocco, Netherlands, Nicaragua, Niger, Nigeria, Pakistan, Peru, Philippines, Poland, Portugal, Republic of Korea, Romania, the Russian Federation, Saudi Arabia, Senegal, Sierra Leone, Slovakia, South Africa, Spain, Sudan, Sweden, Syrian Arab Republic, Thailand, Turkey, the United Kingdom of Great Britain and Northern Ireland, the United States of America, Ukraine, Uruguay, Venezuela & Viet Nam

COPUOS produced the first General Assembly Resolution, Resolution 1721, on space exploration and cooperation in 1961. Resolution 1721 articulated the principles of freedom of use and exploration, non-appropriation and the application of international law, including the UN Charter, to outer space activities.[124] Resolution 1721 was followed two years later by the General Assembly Resolution 1962, which contained the Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space. [125] While neither of these resolutions were binding on the international community, they did establish a foundation for the legal framework of outer space. The law regulating space activities has developed progressively since 1963 relying, to some extent, on analogies between outer space and the regulation of the high seas, air space and Antarctica. [126]

Significant progress was made in advancing the development of space law during the 1967 to 1979 period. The Outer Space Treaty was adopted in 1967[127] and, subsequently, four additional multilateral treaties were developed and adopted. These treaties incorporated, into legally binding instruments, the legal principles relating to: the rescue and return of spacecraft and

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[124] *International Co-operation in the Peaceful Uses of Outer Space*, GA Res. 1721(XVI) (1961).
[125] *Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space*, GA Res. 1962(XVIII) (1963).
[126] See Bruce A. Hurwitz, *The Legality of Space Militarization*, *supra*, note 112 at 24, where the author discusses at some length the value and dangers of analogies to other areas of international law in developing international space law, and particularly the principles reflected in General Assembly Resolutions 1721 and 1962. He notes that the freedom of the high seas analogy assisted in the development of the freedom of exploration and use principle, a corner stone of international space law, since both the high seas and outer space are beyond state sovereignty. He further notes that in addition to maritime law, air law analogies have been and will continue to be relied on to address such issues as safety, licensing, registration and control. Finally he notes that the *Antarctic Treaty,* 1 December 1959, 402 U.N.T.S. 71 (entered into force 23 June 1961), has been relied on to assist in the development of the arms control and demilitarization provisions found in international space law.
[127] *Outer Space Treaty*, *supra* note 16.

astronauts;[128] international liability for space activities;[129] registration obligations;[130] and, activities on the moon and other celestial bodies.[131] Of these five international space agreements, two deal directly with the question of military uses of space, the moon and celestial bodies: the 1967 Outer Space Treaty; and, the 1979 Moon Treaty. Both of these agreements are examined below. In addition there are a limited number of other international agreements that impact upon militarization and weaponization of space which are also discussed.

2.2.1 Outer Space Treaty

The Outer Space Treaty is the first and, undoubtedly, the most significant of the five multilateral agreements that COPUOS has overseen. It entered into force on 10 October 1967, and, as of 1 January 2005 has been ratified by 98 states and signed by 27 others.[132] The Outer Space Treaty establishes the basic principles of international space law and, is routinely referred to as the Magna Carta or constitution of outer space.[133] The Preamble to the Treaty recognizes the common interest of all mankind in the exploration and use of

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[128] *The Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects launched into Outer Space*, 22 April 1968, 672 U.N.T.S. 119 (in force 3 December 1968) (hereinafter the "Rescue and Return Agreement")
[129] *Convention on the International Liability for Damage Caused by Space Objects*, 29 March 1972, 1961 U.N.T.S. 187 (in force 1 September 1972) (hereinafter the "Liability Convention")
[130] *Convention on the Registration of Objects Launched into Outer Space*, 12 November 1974, 1023 U.N.T.S. (in force 15 September 1976) (hereinafter the "Registration Convention")
[131] *The Moon Treaty, supra*, note 17.
[132] "United Nations Treaties and Principles on Space Law", Online - United Nations Office for Outer Space Affairs <http://www.oosa.unvienna.org/SpaceLaw/treaties.html> provides updated information on the status of the Outer Space Treaty and the other UN sponsored multi-lateral space treaties.
[133] See Stephen Groove, "Sources and Principles of Space Law" in Nandasiri Jasentuliyana, ed., *Space Law Development and Scope* (Westport Ct: Praeger Publishers, 1992) 45 at 46; and Christopher M. Petras "The Debate Over the Weaponization of Space – A Military-Legal Conspectus" (2003) XXVIII Ann. Air & Sp. L. 171.

outer space for peaceful purposes. The basic legal principles underpinning space exploration and use are found in Articles I through III of the Treaty and, flow directly from General Assembly Resolutions 1721 and 1962.[134] These fundamental legal elements are:

(a) **the common interest of all countries in the exploration and use of outer space regardless of the degree of economic or scientific development.**[135] This principle has generated much debate over the years with some arguing that common interest equates to the equitable sharing of any benefits of outer space use among all state parties to the Treaty. However, the more widely held view is that this principle is restricted to ensuring all states, having or acquiring the scientific and financial resources to allow access to space, shall be assured equitable access thereto;[136]

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[134] See *supra* notes 124 and 125. Also see Hamilton DeSaussure, "The Freedoms of Outer Space and Their Maritime Antecedents" in Nandasiri Jasentuliyana, ed., *Space Law Development and Scope ibid* 1 at 5, where the author briefly traces the history of the fundamental principles, noting that they were first recognized in General Assembly Resolution 1721, embodied in General Assembly Resolution 1962, and ultimately incorporated into the *Outer Space Treaty*.

[135] *Outer Space Treaty*, *supra* note 16 Article 1.

[136] Bess C.M. Reijnen, *The United Nations Space Treaties Analysed* (France, Editions Frontières, 1992) at 89. This practice is also reflected in the *Principles Relating to Remote Sensing of the Earth From Outer Space*, 3 December 1986, U.N. Doc. A/Res/41/65, which states in Principle II that, "Remote sensing activities shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic, social or scientific and technological development ...". However Principle XII simply assures sensed states access to data on a non-discriminatory basis and on reasonable cost terms. This means that data is provided to sensed states by sensing states on request but at market rates. See Gabrynowicz, J.I., "Defining Data Availability for Commercial Remote Sensing Systems" (1998) Ann. Air & Sp L. Vol XXIII 93. See also Bruce Hurwitz, *The Legality of Space Militarization, supra* note 112 at 57 where he writes, (quoting Fawcett) "It also means that 'States have equal rights of access to and use of outer space.' It 'does not assure to them equally the economic resources and technological means of exercising those rights, or the benefits to be derived from them'."

(b) **freedom of access to, use of and exploration of outer space.**[137] As in all areas of human activity, freedom is not completely unrestricted in the space context. The common interest principle, other provisions of the Outer Space Treaty, and general international law all place constraints on the freedoms of use, access and exploration. State practice, flowing from the launch of the first objects into space, official statements by the early space powers and the fact that both General Assembly Resolutions 1761[138] and 1962[139] have enunciated the freedom principle have led to the widely accepted view that the principle has acquired the status of customary international law;[140]

(c) **non-appropriation of outer space and celestial bodies.** [141] This is simply a necessary extension of the common interest and freedom principles. To allow appropriation of space would lead to the exclusion of other state parties from both exploration and use. Interestingly, and despite the arguably unambiguous wording of Article II in this regard, eight equatorial countries, all currently having either signed or ratified the Outer Space

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[137] *Outer Space Treaty*, *supra* note 16, Article I.
[138] See *International Co-operation in the Peaceful Uses of Outer Space, supra* note 124.
[139] See *Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, supra* note 125.
[140] Ivan A. Vlasic, "The Growth of Space Law 1957-65: Achievements and Issues" in René H. Mankiewicz ed. *Yearbook of Air and Space Law 1965.* (Montreal: McGill University Press 1965)
[141] *Outer Space Treaty*, *supra* note 16, Article II.

Treaty,[142] participated in the 1976 Bogotá Declaration. The Declaration claimed the geosynchronous orbits directly over their countries. The Declaration was driven by concerns over the exclusive first come first serve approach to allocating satellite slots in this limited orbit. The signatories to the Declaration argued that, since satellites in geosynchronous orbit are in a stationary position in relation to the earth, the orbits are in fact an extension of territorial space.[143] While the Declaration has been subject of much discussion in the international forum, no state has recognized this claim; and

(d) **international law, including the UN Charter, is applicable in the space environment.**[144] Article III of the Outer Space Treaty expressly recognizes that *lex generalis,* or general international law is applicable in the outer space.[145] However, this is not to say that all principles of general international law apply in space, "... certain rules of international law and/or provisions of the Charter cannot, by definition, apply to outer space, or are of a nature of *lex specialis* for certain environments, Article III is not an automatic extension to outer space and celestial bodies of

[142] Those states that have ratified the *Outer Space Treaty* are clearly bound by it while those that have signed it are obligated to refrain from acts that would defeat the object and purpose of the Treaty. See the *Vienna Convention on the Law of Treaties supra* note 96, Articles 18 and 26.
[143] Joel D. Scheraga, "Establishing Property Rights In Outer Space" Cato Journal, Vol. 6, No. 3 (Winter 1987) 889 at 897. The eight countries that signed the Declaration are Brazil, Colombia, Ecuador, Indonesia, Congo, Kenya, Uganda, and Zaire.
[144] *Outer Space Treaty, supra* note 16 Article III.
[145] Manfred Lachs, *The Law of Outer Space: An Experience in Contemporary Law Making* (Leiden: Sijthoff, 1972) at 14

international law, including the Charter of the United Nations, *in toto.*"[146].

In addition to identifying the fundamental legal elements or principles of space law, the Outer Space Treaty also addresses military uses of space in Article IV. It is the drafting of this Article that leads one to conclude that military activities, including the placing of weapons in space, may well be subject to different legal considerations depending upon where in space military activity is being pursued. Article IV states:

> "States Parties to the Treaty undertake not to place in orbit around the earth any objects 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 States 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 manoeuvres 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."[147]

Paragraph 1 of Article IV prohibits the placing of nuclear weapons or other weapons of mass destruction in earth orbit, in outer space or on celestial bodies. The moon, however, is not expressly mentioned. This has led some to suggest that the Treaty in fact permits the basing of nuclear weapons on the

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[146] Christopher M Petras, "The Debate Over the Weaponization of Space – A Military-Legal Conspectus" *supra* note 133 at 182.
[147] *Outer Space Treaty*, *supra* note 16 Article IV

moon.[148] Those advocating this view note that the term "celestial bodies" was not intended to include the moon, as "moon" is referred to separately in other Articles of the Treaty. Others argue that the moon is included in the term "celestial bodies" whether it is expressly mentioned or not,[149] while still others take the view that the failure to refer to the moon was simply a drafting oversight.[150] It is submitted, that to interpret paragraph 1 as excluding the moon from the prohibition against nuclear weapons and other weapons of mass destruction would be inconsistent with the wording of paragraph 2, which provides that the moon shall be used "exclusively" for peaceful purposes. As a result, the better view appears to be that the exclusion of an express reference to the moon in paragraph 1 is of no consequence and, that the Outer Space Treaty prohibits the placing of nuclear weapons, or any other weapons of mass destruction, anywhere in outer space.

The use of the phrase "exclusively for peaceful purposes" in paragraph 2 of Article IV also raises a number of questions and has resulted in two schools of thought relating to the scope of application of the "exclusively for

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[148] Christopher M Petras, "The Debate Over the Weaponization of Space – A Military-Legal Conspectus" *supra* note 133 at 185, where the author cites G.S. Raju, "Military Use of Outer Space: Towards Better Legal Controls" in Nandasiri Jasentuliyana ed. , *Maintaining Outer Space for Peaceful Purposes, Proceedings of a Symposium held in the Hague, Mar. 1984* (Tokyo: United Nations University, 1984) 90 at 126.

[149] Bin Cheng, *Studies in International Space Law, supra* note 89 at 527, where the author states "The Treaty constantly uses the expression, 'outer space, including the moon and celestial bodies'. In general, therefore, for the purposes of the Treaty, 'outer space' includes 'celestial bodies', and 'celestial bodies' include 'the moon'. For an opposing view see Bruce A. Hurwitz, *The Legality of Space Militarization supra* note 112 at 60 who refers to the drafting history of Article IV, noting that the U.S. objected to a Soviet proposal to include reference to the moon, and then states "... and therefore "[t]he inference must be that the U.S. persuaded the U.S.S.R. to agree to the omission and that it is therefore deliberate," i.e., that the term "celestial bodies" *does not* include the moon." Quoting from J.E.S. Fawcett, "The Politics of the Moon" 25 The World Today (August, 1969), p. 360,

[150] See for example Carl Q. Christol, *The Modern International law of Outer Space* (New York; Pergamon Press, 1982) at 20 and quoted by Christopher M. Petras, "The Debate Over the Weaponization of Space – A Military-Legal Conspectus" *supra* note 133 at 185, where Christol states that "...in most instances the inconsistent and non-uniform use of 'outer-space', 'the moon', and 'other celestial bodies' can be laid to time constraints and other exigencies surrounding the drafting process."

peaceful purposes" clause. The first school considers the wording of Article IV paragraph 2 and it's drafting history to conclude that the "exclusively for peaceful purposes" restriction refers only to the moon and other celestial bodies. It does not include outer space itself or, more specifically, orbits around the earth. This interpretation leads to the inevitable conclusion that while the conduct of military activities is prohibited on the moon and other celestial bodies, this prohibition does not extend to outer space itself:

> "It would follow that Article IV(2) which limits the use of the 'moon and celestial bodies' to 'exclusively peaceful purposes' does not apply to outer space in the narrow sense of the term, meaning the void between celestial bodies, which, in order to avoid confusion and for the sake of brevity, we shall hereinafter refer to as the "outer void space". In other words, notwithstanding a great deal of wishful thinking, misunderstanding, propaganda and sometimes even misrepresentation, *the 1967 Treaty has not reserved outer space as a whole for use exclusively for peaceful purposes.*"[151] (Emphasis added by author)

The wishful thinkers and propagandists referred to above are those who support the second school of thought on this question. Proponents of the second theory, argue that the reference to peaceful purposes in Article IV cannot be interpreted in isolation, but rather must be considered in the much broader context of the Treaty as a whole.[152] This broad contextual approach

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[151] Bin Cheng, *Studies in International Space Law, supra* note 89 at 527. See also Christopher M. Petras, "The Debate Over the Weaponization of Space – A Military-Legal Conspectus" *supra* note 133 at 186 where he states "...the omission of outer space from the second paragraph of Article IV was arguably intentional and designed to permit States to carry out certain space activities for military purposes, such as the use of reconnaissance satellites."

[152] *Outer Space Treaty, supra* note 16. The Preamble recognizes "the common interest of all mankind in the progress of the exploration and use of outer space for *peaceful purposes*" ... the desire "to contribute to broad international cooperation in the ... use of outer space for *peaceful purposes*;" (emphasis added). Article I refers to exploration and use being "carried out for the benefit and in the interests of all countries", Article III speaks to the maintenance of "international peace and security and promoting international cooperation and understanding" and Article IX provides that States "shall be guided by the principle of cooperation and mutual

requires consideration of the underlying principles of the Treaty, including the "common interest of all mankind", the "benefit of all peoples", "broad international cooperation", "furthering the purposes of the U.N.", "use in accordance with international law", "maintaining peace and security", "promoting international cooperation" and "having regard for the interests of other States", all referenced in the Preamble and elsewhere in the Outer Space Treaty.[153] Proponents of this interpretation conclude that all of space is subject to the peaceful purposes restriction found in Article IV paragraph 2.[154]

Similarly, the second sentence of paragraph 2 forbids the establishment of military bases, the testing of weapons, and the conduct of military manoeuvres on celestial bodies, but it does not make reference to the moon. This might well allow one to conclude that the prohibited military activities identified in the sentence might well be pursued on the moon. However, as noted above, some jurists have argued that the term 'celestial bodies' in the Treaty includes the moon.[155] In addition, to interpret the prohibitions in the second sentence as not including the moon would, be contrary to the intent expressed in the first sentence of the paragraph in that it would not accord with the "exclusively peaceful purposes restriction. [156]

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assistance and shall conduct all their activities in outer space, including the moon and other celestial bodies, with due regard to the corresponding interests of other States Parties to the Treaty."

[153] *ibid*

[154] Richard A. Morgan, "Military Use Of Commercial Communication Satellites: A New Look At The Outer Space Treaty And 'Peaceful Purposes'" (1994) 60 J. Air L. & Com. 237 at 302.

[155] Bin Cheng, *Studies in International Space Law, supra* note 89 at 527.

[156] *Ibid* at 528, where Dr. Cheng states "The omission of a reference to the moon in the second sentence of Article IV(2), where 'celestial bodies' alone are mentioned is not regarded as significant, for reasons which have already been given, namely, in the terminology of the Treaty, the term 'celestial bodies' includes the moon. However, it cannot be precluded that, for those intent on doing so, this omission may well be seized upon, together with some of the other factors mentioned below, as justification to establish military bases, installations and fortifications, to test weapons and to conduct military manoeuvres on the moon, subject only to the prohibitions found in Article IV(1)."

While Article IV excludes nuclear and other weapons of mass destruction from space, this does not amount to a blanket exclusion of such weapons. The wording of Article IV paragraph 1 allows for the incidental passage of nuclear weapons through space, as occurs in the event of the launch of an intercontinental ballistic missile. This was clearly intended by the drafters in recognition of the fact that both of the space powers during the cold war period and, at the time of the drafting of the Treaty, relied heavily on their intercontinental ballistic missile capability as the primary form of deterrence.[157]

Article V provides for the safe and prompt return of astronauts and provides the basis for the Rescue and Return Agreement.[158] Article VI holds states internationally responsible for their activities in space, the activities of their nationals and the activities of international organizations to which states belong.[159] Article VII establishes that states launching, procuring a launch or from whose territory an object is launched into space are internationally liable for any damage caused to other states or their nationals, whether that damage occurs on the earth, in the atmosphere or in space.[160] Article VIII provides that the states of registration[161] retain jurisdiction and control over both their space

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[157] *E.g.* Philip D. O'Neil , Jr. "The Development of International Law Governing the Military Use of Space" ed. William J. Durch, *National Interests and the Military Uses of Space* (Cambridge, Massachusetts: Ballinger, 1984) 169 at 178, where the author notes "...that there is no limitation on [nuclear and other weapons of mass destruction] passing through space (e.g., warheads on missiles)."

[158] *Rescue and Return Agreement*, *supra* note 128.

[159] The imposition of state responsibility for the activities of nationals is a significant departure from the general rule of state responsibility in international law, which provides that States bear responsibility only for state action.

[160] *Outer Space Treaty*, *supra* note 16, Article VII. This Article establishes the basic liability of states in the conduct of outer space activity. The rules and procedures relating to liability are addressed in detail in the *Liability Convention*, *supra* note 129.

[161] The *Outer Space Treaty* presumes that all State Parties will establish and maintain a registry of space objects but does not expressly impose an obligation to do so. However, Article II of the *Registration Convention*, *supra* note 130 imposes this positive obligation.

objects and any persons in or on the space object while in space or on any celestial body.[162]

Finally, Articles IX through XII addresses matters of co-operation and mutual assistance in furtherance of the goals of international cooperation and peaceful exploration and use of outer space.[163] Article IX is of particular relevance to questions relating to the use of force in space, in that it imposes an obligation on States to undertake "appropriate international consultations" before proceeding with any activity or experiment that would cause potentially harmful interference "with activities of other State Parties in the peaceful exploration and use of outer space." Presuming that there are circumstances where force may be lawfully used in the outer space environment, Article IX would appear to impose an obligation to consult prior to exercising the lawful right to employ force. Such an obligation is inconsistent with a state of belligerency as between the parties to the conflict and as such would not, it is suggested, be effective during a period of conflict.[164] However, there might

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[162] In discussing the question of non-appropriation of both outer space and celestial bodies, or *res extra commercium*, Dr. Cheng notes that this raises legal issues surrounding the exercise of state jurisdiction and the possibility of a state of lawlessness. He, however, notes that like the high seas, states can and will exercise quasi-territorial jurisdiction to avoid a state of lawlessness, and this is expressly envisaged by the *Outer Space Treaty*, *supra* note 16, Article VIII. See Bin Cheng, *Studies in International Space Law*, *supra* note 89 at 231.

[163] Article IX provides that State Parties shall be guided by the principle of cooperation and mutual assistance, and conduct their activities giving due consideration to the interests of other state parties. The article further allows state parties to request consultations with another state party where it is believed that the activities of that state would potentially cause harmful interference with the peaceful exploration and use of outer space. Article X obligates states to consider any request by other state parties to observe space flight launches, and Article XI provides that states will inform the Secretary General of the United Nations, the public, and the international scientific community of the nature, conduct, location and results of their outer space activities. Finally, Article XII provides that all stations, installations, equipment and space vehicles on the moon and other celestial bodies shall be open to visits by other state parties on the basis of reciprocity.

[164] The impact of a state of armed conflict on treaty obligations is open to much debate in international law. The *Vienna Convention on the Law of Treaties* only addresses the issue to the extent of stating in Article 73 that the "Convention shall not prejudge any question that may arise in regard to a treaty ... from the outbreak of hostilities." L.C. Green, *The Contemporary Law of Armed Conflict* 2nd ed. (Manchester: Manchester University Press, 2000) at 75 notes that "it is clear that Treaties of a political or trading character between belligerents will cease to

well remain an obligation to consult with other state parties to the Treaty in such a circumstance, since it is reasonable to conclude that the harmful effects of the use of force in space may not be limited to the belligerents.[165]

The Outer Space Treaty is undoubtedly the foundation of the legal framework within the space environment. However, the lack of consistency in the usage of terminology within the Treaty and, perhaps more importantly, the absence of definitions of the terms used in the Treaty, has led to significant debate over the precise limits placed on military activities in space.[166] The most fundamental issue in this regard arises in the context of the meaning of the term "peaceful purposes," and how the "peaceful purposes" principle impacts upon issues of militarization and weaponization of space. This issue is discussed in detail later in this chapter.

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operate, at least for the duration of the hostilities ... If the belligerents are parties to a multi-lateral treaty, the outbreak of hostilities does not affect the continued subsistence as among the non-belligerents, nor does it affect its continuance as between each belligerent and such third states, although it may be possible for any party to argue that such circumstances have so changed as a result of the outbreak of hostilities that the treaty must cease to apply by virtue of the doctrine *rebus sic stantibus*." The Institute of International law adopted a resolution titled *The Effects of Armed Conflict on Treaties*, in Helsinki in 1985 accessible at <http://www.idi-iil.org/idiE/navig_chon1983.html>. The resolution states that the outbreak of an armed conflict does not *ipso facto* terminate or suspend the operation of treaties in force between the belligerents, or terminate or suspend the operation of that treaty between other contracting States and the belligerents. It further provides that a State exercising its rights of individual or collective self-defence in accordance with the Charter of the United Nations is entitled to suspend in whole or in part the operation of a treaty incompatible with the exercise of that right, and a State complying with a resolution by the Security Council of the United Nations concerning action with respect to threats to the peace, breaches of the peace or acts of aggression shall either terminate or suspend the operation of a treaty which would be incompatible with such resolution. Finally the resolution provides that at the end of an armed conflict and unless otherwise agreed, the operation of a treaty, which has been suspended, should be resumed as soon as possible. See *infra* Chapter Three for further discussion.

[165] The creation of space debris as the result of the use of force, or even the employment of technology to jam or otherwise interfere with the operation of a belligerent's space assets, might well interfere with the space activities of other state parties, triggering this obligation.

[166] Bhupendra Jasani, "Introduction" ed. Bhupendra Jasani, *Peaceful and Non-Peaceful Uses of Space – Problems of Definition for the Prevention of an Arms Race, supra* note 78 at 4.

2.2.2 The Moon Treaty

The Moon Treaty was opened for signature on 18 December 1979 and was the last of the multi-lateral space agreements developed in COPUOS and adopted by the General Assembly. It has also been the least well received of the five space treaties, having entered into force with five ratifications on 11 July 1984 and, as of 1 January 2005, has been ratified by only 11 states with 5 others having signed the Treaty. None of these states are significant actors in outer space.[167] In light of its very limited acceptance within the international community, some scholars view the Moon Treaty as not being significant in the area of space law and do not include the Treaty as one of the multilateral agreements forming the body of conventional international space law.[168]

The Moon Treaty reiterates many of the principles found in the Outer Space Treaty, including: the application of general international law to "all activities on the moon";[169] that "the exploration and use of the moon shall be the province of all mankind and shall be carried out for the benefit and in the interests of all countries"[170] and, that the moon is not subject to national appropriation.[171] In addition, the Moon Treaty, like the Outer Space Treaty, imposes international responsibility on States for all national activities on the moon[172] and, provides that States retain jurisdiction and control over their

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[167] *The Moon Treaty*, *supra*, note 17. The 11 ratifying states are Australia, Austria, Belgium, Chile, Kazakhstan, Mexico, Morocco, Netherlands, Pakistan, Philippines and Uruguay. The 5 signatory states are Gabon, Guatemala, India, Peru and Romania.
[168] Christopher M. Petras, *supra* note 133 at 176 and at 177 n. 35, where the author states "International space law proper is composed of four multilateral space treaties: the 1967 Outer Space Treaty, the 1968 Rescue Agreement, the 1972 Liability Convention, and the 1975 Registration Convention." In the accompanying footnote it is noted that "[the Moon Treaty] has not been ratified by the United States or any other major space power and so is viewed as having no real significance in establishing international space law."
[169] *The Moon Treaty*, *supra* note 17, Article 2
[170] *ibid* Article 4
[171] *ibid* Article 11(2)
[172] *ibid*, Article 14(1)

"personnel, space vehicles, equipment, facilities, stations and installations on the moon."[173]

The Moon Treaty has a much broader scope of application than simply the moon. Its provisions extend to all other celestial bodies within the solar system, other than the earth, and to orbits and trajectories around the moon. The Treaty further provides that it will not apply where "specific legal norms enter into force with respect to any of these celestial bodies."[174]

With respect to military activities, Article 3 of the Moon Treaty provides that "the moon shall be used exclusively for peaceful purposes." The placing of nuclear, or other weapons of mass destruction on or in the moon or in orbit around or on a trajectory to the moon is prohibited.[175] The Treaty prohibits the establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres.[176] Any threat or use of force, or other hostile acts or threats thereof on the moon or from the moon in relation to the earth, the moon, spacecraft, the personnel of spacecraft or man made space objects is also prohibited.[177]

Articles 3(1), 3(3) and 3(4) of the Moon Treaty are largely repetitive of the prohibitions found in Article IV of the Outer Space Treaty, although they may be viewed as clarifying the omission of a reference to the moon in the second sentence of Article IV(2) of the Outer Space Treaty.[178] Article 3(2) also appears to simply be a re-iteration of the principle reflected in Article 2(4) of the UN Charter, which provides that "All members shall refrain in their

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[173] *ibid* Article 12(1)
[174] *ibid* Article 1
[175] *Ibid* Article 3(3)
[176] *ibid* Article 3(4)
[177] *ibid* Article 3(2)
[178] See the discussion *supra* in part 2.2.1 Outer Space Treaty.

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."[179] In short, the Moon Treaty re-states provisions relating to arms control, demilitarization and the use of force but it does not make any substantial changes in this area.

The most significant aspect of the Moon Treaty, and the most controversial, is the manner in which it addresses the exploitation of the moon's natural resources. Article 11(1) declares the moon and its natural resources as the "common heritage of mankind" (CHM).[180] CHM is a relatively new concept in international law, with its use in the Moon Treaty being one of the first times the concept has been incorporated into an international treaty. As such, the regime lacks a precise definition. It has been described as being similar, in some respects, to areas of *res communis* (shared by all and incapable of appropriation). However, unlike *res communis,* the exploitation and distribution of natural resources under a CHM regime is not left to the discretion of individual states on a first come first serve basis, but rather is determined by the international community.[181] This concept, while welcomed by many developing nations, is viewed as a potential barrier to the economic

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[179] *Charter of the United Nations*, 26 June 1945, Can. T.S. No. 7 (entered into force 24 October 1945). Both the *Moon Treaty*, *supra* note 17, Article 2, and the *Outer Space Treaty*, *supra* note 16, Article III, provide that all activities shall be carried out in accordance with international law, including the *Charter of the United Nations*.

[180] See Kindred et al *International Law Chiefly as Interpreted and Applied in Canada, supra* note 90 at 397, where he states "In recent years, beginning with the U.N.G.A. Seabed resolution of 1970, a new legal category of territory has been added to the traditional ones – territory designated as the "Common Heritage of Mankind" (CHM) – which is governed by special rules. The areas subject to the regime of the CHM are the seabed, the ocean floor and the subsoil thereof, lying beyond the limits of national jurisdiction, as well as the moon and other celestial bodies."

[181] *Ibid* at 359, citing Bin Cheng "The Legal Regime of Airspace and Outer Space: The Boundary Problem, Functionalism versus Spatialism: The Major Premises" (1980), V Ann. Air & Sp. L. 323 at 327. Involvement of the international community in the exploitation and distribution of natural resources on the moon is reflected in Article 11 of the *Moon Treaty*, which calls for the establishment of an international regime to govern the exploitation of the natural resources of the moon when exploitation is about to become feasible.

exploitation of resources on the moon and other celestial bodies due to the commercial uncertainty it generates. This was one of the major reasons for the American decision not to sign the Moon Treaty and has contributed to its limited acceptance within the international community.[182] The limited acceptance of the Treaty has, in turn, limited its impact on the regulation of the military uses of outer space.[183]

2.2.3 Other International Instruments

In addition to the five COPUOS Treaties governing the uses and exploration of outer space, there are a number of other international agreements impacting upon the military uses of space that either form part of the *corpus juris spatialis*, such as the 1963 Limited Test Ban Treaty,[184] or impact upon use of force issues in outer space, such as the Environmental Modification Convention.[185]

2.2.3.1 Limited Test Ban Treaty

The Limited Test Ban Treaty was negotiated between the Soviet Union, the United Kingdom and the United States as a step towards "general and

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[182] Robert A. Ramey, "Armed Conflict on the Final Frontier: The Law of War in Space" *supra* note 32 at 99. See also Todd Barnet "Legal Fictions in the Five United Nations Space Treaties Stifle Commerce and Encourage a Dangerous and Chaotic Space Environment" (2000) XXVIII Ann. Air & Sp. L. 257 at 271 n. 51, where the author states "The United States has declined to sign the Moon Agreement, which would greatly increase obligations towards developing countries, not least in its total denial of private property rights."

[183] Bin Cheng *Studies in International Space Law supra* note 89 at 534.

[184] *The Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space, and Under Water*, 5 August 1963, 1964 Can T.S. No. 1; 480 U.N.T.S. 43 (entered into force 10 October 1963) [hereinafter *Limited Test Ban Treaty*].

[185] *Convention on the Prohibition of Military or any Other Hostile use of Environmental Modification Techniques*, 18 May 1977, 1108 U.N.T.S. 151 (entered into force on 17 January 1980) [hereinafter *ENMOD Convention*].

complete disarmament under strict international control."[186] Subsequently ratified by more than 100 States,[187] it has been described as the most successful disarmament treaty in history,[188] although, neither France nor China, both nuclear states, has ratified the Treaty.[189]

The Limited Test Ban Treaty prohibits nuclear weapons tests "or any other nuclear explosion" in the atmosphere, in outer space, and under water. It does not ban underground testing, however the Treaty does prohibit nuclear explosions in the environment if they cause "radioactive debris to be present outside the territorial limits of the state under whose jurisdiction or control" the explosions were conducted.[190] The reference to "any other nuclear explosion" is intended to prohibit explosions undertaken for peaceful purposes, simply because of the difficulty of differentiating between weapons tests explosions and peaceful purposes explosions. The Limited Test Ban Treaty was the first Treaty to regulate state activity in outer space. [191]

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[186] *Limited Test Ban Treaty, supra* note 184, Preamble.
[187] A list of state parties to the *Limited Test Ban Treaty* can be found at "Canada Treaty List", Online - Department of Foreign Affairs, <http://www.treaty-accord.gc.ca/Treaties_CLF/Details.asp?Treaty_ID=103575>.
[188] Ivan Vlasic "The Legal Aspects of Peaceful and Non-Peaceful Uses of Outer Space" ed. Bhupendra Jasani, *supra* note 78 at 44.
[189] "Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water", Online - Bureau of Arms Control, U.S. Department of State <http://www.state.gov/t/ac/trt/4797.htm#signatory>. See also Nicolas Mateesco Matte, "The Treaty Banning Nuclear Weapons Tests in the Atmosphere, In Outer Space and Under Water (10 October 1963) and the Peaceful uses of Outer Space" (1984) IX Ann. Air & Sp. L. 391 at 405 where the author notes that between 1963 and 1982, France and China continued their high altitude tests with China conducting 22 such tests and France 41.
[190] *Limited Test Ban Treaty, supra* note 184, Article I. See also Nicolas Mateesco Matte, *ibid* at 401, where it is stated that "A careful reading of [Article 1] shows that nuclear explosions are prohibited in all environments except underground tests carried out within the territorial limits of the parties to the Treaty."
[191] Christopher M. Petras "The Debate Over the Weaponization of Space – A Military-Legal Conspectus" *supra* note 133 at 177. A Comprehensive Test Ban Treaty was open for signature on 10 September 1996, but has yet to enter into force. See the "Comprehensive Test Ban Treaty Organization" Online - Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization <http://www.ctbto.org/>

2.2.3.2 Anti-Ballistic Missile Treaty

The 1972 Anti-Ballistic Missile Treaty[192] was first of a number of bilateral treaties entered into between the United States and the Soviet Union that expressly recognized the existence of "National Technical Means" (NTMs) of verification. While NTMs are not defined in the treaty, they have been generally described as any "nationally owned system for monitoring compliance with arms control agreements which operates remotely from the activities being monitored."[193] Many monitoring systems fall within the ambit of this definition of NTMs and NTMs are understood to include photo reconnaissance satellites and space based sensors.[194] The effect of the NTM provision in the ABM Treaty was two fold. First, it provided formal, albeit implicit recognition, by the Soviet Union, of the "legitimacy and legality" of

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[192] *Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Anti-Ballistic Missile Systems* 1972, 23 U.S.T. 3435 (entered into force 3 October, 1972) [hereinafter the *ABM Treaty*]. The ABM Treaty was entered into at the same time as the *Interim Agreement Between the United States of America and the Union of Soviet Socialist Republics on Certain Measures with Respect to the Limitation of Strategic offensive Arms*, 1972, 23 U.S.T. 3462 (entered into force 3 October 1972) [hereinafter *SALT 1*] .

[193] Nicolas Mateesco Matte, *supra* note 189 at 240. Both the *ABM Treaty* and the *SALT 1* Treaty contain identical provisions prohibiting interference with NTMs, Article XII of the *ABM Treaty* provides:

> 1. For the purpose of providing assurance or compliance with the provisions of this Treaty, each Party shall use national technical means of verification at its disposal in a manner consistent with generally recognized principles of international law.
> 2. *Each Party undertakes not to interfere with the national technical means of verification of the other Party operating in accordance with paragraph 1 of this Article.*
> 3. Each Party undertakes not to use deliberate concealment measures which impede verification by national technical means of compliance with the provisions of this Treaty. This obligation shall not require changes in current construction, assembly, conversion, or overhaul practices. (emphasis added)

[194] Allan Rosas, "The Militarization of Space and International Law" (1983) Vol. 20 No. 4 Journal of Peace Research 357 at 359. Also see "European Regional Arms Control and Disarmament", Online - Non-Proliferation, Arms Control & Disarmament Division, Department of Foreign Affairs Canada <www.dfait-maeci.gc.ca/arms/european3-en.asp> where NTMs are described as "generally refers to satellite and other remote surveillance systems which operate from outside of the inspected country's borders."

space based reconnaissance systems[195] and, secondly, as between the parties to the Treaty, it prohibited interfering with the functioning of space based systems used for verification purposes.[196]

The June 2002, withdrawal of the United States from the ABM treaty has seen the termination of this original NTM clause.[197] However, in 1992 the Treaty on Conventional Armed Forces in Europe (CFE),[198] which limits the amount of major military equipment the state parties may hold in the area to which the Treaty applies, came into force.[199] This Treaty is important from a space law perspective because it includes an NTM provision in Article XV, similar to that used in the ABM Treaty. The CFE clause is of particular significance because it provides for recognition of the principle of non-interference with NTM satellites in a multilateral treaty currently involving 30 state parties.[200] It also expands the notion of NTMs to include Multinational

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[195] Philip D. O'Neil , Jr. "The Development of International Law Governing the Military Use of Space", *supra* note 157 at 179. While in practice the Soviet Union accepted space based over flights of its territory by foreign reconnaissance satellite, and it itself undertook such activities, the Soviet Union had not formally abandoned its position that such activity was not permitted under international law. See also D Goedhuis, "Some Recent Trends in the Interpretation and the Implementation of the Rules of International Space Law" (1981), 19 Columbia Journal of Transnational Law, 213 at 229.

[196] Paul B. Stares, *The Militarization of Space: U.S. Policy, 1945 – 1984* (Cornell: Cornell Univ. Press, 1988) at 166.

[197] "U.S. Diplomatic Notes on ABM Treaty", Online - Office of Treaty Compliance, U.S. Department of Defence <http://www.defenselink.mil/acq/acic/treaties/abm/ABMdipnotes1.htm>. In its notification of withdrawal dated 13 December 2001, the U.S. Government noted that the proliferation of "long-range ballistic missiles, as a means of delivering weapons of mass destruction... pose[s] a direct threat to the territory and security of the United States and jeopardizes its supreme interests. As a result, the United States has concluded that it must develop, test, and deploy anti-ballistic missile systems...Pursuant to Article XV, paragraph 2, the United States has decided that extraordinary events related to the subject matter of the Treaty have jeopardized its supreme interests. Therefore, in the exercise of the right to withdraw from the Treaty provided in Article XV, paragraph 2, the United States hereby gives notice of its withdrawal from the Treaty. In accordance with the terms of the Treaty, withdrawal will be effective six months from the date of this notice."

[198] *Treaty on Conventional Armed Forces in Europe*, 19 November 1990, Can. T.S. 1992 No. 37 (entered into force 9 November 1992) [hereinafter *CFE Treaty*].

[199] *Ibid*, Article II, which defines the Treaty's area of application as being "the entire land territory of the States Parties in Europe from the Atlantic Ocean to the Ural Mountains.

[200] Armenia, Azerbaijan, Belarus, Belgium, Bulgaria, Canada, Czech Republic, Denmark, France, Georgia, Germany, Greece, Hungary, Iceland, Italy, Kazakhstan, Luxembourg,

Technical Means (MTMs). This in effect recognizes that jointly operated verification systems will benefit from the non-interference principle.

2.2.3.3 Environmental Modification Convention

The final Treaty that makes reference to outer space, and is relevant in a use of force context, is the 1977 ENMOD Convention.[201] State Parties to this Convention "undertake not to engage in military or any other hostile use of environmental modification techniques having widespread, long-lasting or severe effects as the means of destruction, damage or injury to any other State Party."[202] "Widespread" is understood to mean "encompassing an area on the scale of several hundred square kilometres"; "long-lasting" as "lasting for a period of months, or approximately a season"; and "severe" as "involving serious or significant disruption or harm to human life, natural and economic resources or other assets."[203]

"Environmental modification techniques" refers to any technique for changing -- through the deliberate manipulation of natural processes -- the dynamics, composition or structure of the Earth, including its biota, lithosphere, hydrosphere and atmosphere, or of outer space."[204]

For the ENMOD Treaty to be triggered, "deliberate manipulation of natural processes" is required, suggesting that consequential effects would not

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Moldova, Netherlands, Norway, Poland, Portugal, Romania, Russia, Slovak Republic, Spain, Turkey, Ukraine, United Kingdom, United States.

[201] *ENMOD Convention, supra* note 185. The *ENMOD convention* compliments Article 35(2) of *Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts*, 8 June 1977, 1125 U.N.T.S. 3, Can. T.S. 1991 No. 2 (entered into force 7 December 1978 and ratified by Canada 20 November 1990) [hereinafter *AP I*), which prohibits the employment of "methods or means of warfare which are intended, or may be expected, to cause widespread long-term and severe damage to the natural environment." See L.C. Green, *The Contemporary Law of Armed Conflict supra* note 164 at 137.

[202] *ENMOD Convention ibid*, Article I

[203] *Ibid*, Understanding related to Article I

[204] *Ibid*, Article II

violate the Treaty. However, as noted by the ICJ, "States must take environmental considerations into account when assessing what is necessary and proportionate in the pursuit of legitimate military objectives."[205] Thus even non-deliberate manipulation (i.e. the creation of space debris) of the space environment must be assessed if use of force in outer space were ever to be contemplated.[206]

The above noted International Treaties make direct reference to outer space and as such have been the subject of comment. However, it is important to note that in addition to these specific Treaties, general international law is applicable to all space activities.[207]

2.3 Peaceful Purposes

As has been demonstrated above, the term "peaceful" is used in virtually all United Nations documents relating to the uses of outer space, and in each of the five Space Law Treaties.[208] However, despite its widespread usage there is no authoritative definition of the term in any international

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[205] *Legality of the Threat or Use of Nuclear Weapons*, Advisory Opinion, [1996] I.C.J. Rep. 2. at para 30.

[206] See for example the 1992 General Assembly Resolution *Protection of the Environment in Times of Armed Conflict*, 1992, U.N. Doc. A/47/49. The Resolution expresses concerns over the environmental effects of the destruction of oil production facilities and dispersal of crude oil in the Persian Gulf region after the 1991 Gulf War.

[207] *Outer Space Treaty, supra* note 16, Article 3. This means that the Law of Armed Conflict as reflected in both customary and conventional international law will apply to the conduct of armed conflict in the outer space environment.

[208] See *supra* notes 15, 16, 17, 128, 129, and 130. See also *Regulation, Limitation And Balanced Reduction Of All Armed Forces And All Armaments; Conclusion Of An International Convention (Treaty) On The Reduction Of Armaments And The Prohibition Of Atomic, Hydrogen And Other Weapons Of Mass Destruction*, GA Res. 1148 (XII) (1957), which, in the context of urging the finalization of a disarmament agreement, makes the first reference to outer space in a General Assembly Resolution at paragraph 1(f), urging that the subject disarmament agreement provide for "...the joint study of an inspection system designed to ensure that the sending of objects through outer space shall be exclusively for peaceful and scientific purposes"

instrument. Not surprisingly, this has resulted in a long-standing debate over what the term "peaceful purposes" means in the context of outer space and, in turn, what, if any, military uses of space are permitted under international space law.

In the years preceding Sputnik 1 and the development of international space law, outer space, from a legal perspective, was an area of *res nellis.*[209] As such, military uses were legally permitted, even if practically impossible, subject of course to the *jus ad bellum* rules found in general international law and, for UN member states, the provisions of the UN Charter.[210] With the arrival of the space age, both the U.S. and the U.S.S.R expressed official positions to the effect that "future developments in outer space would be devoted exclusively to peaceful and scientific purposes,"[211] language suggesting that the use of space for military purposes was to be prohibited. The public rhetoric, however, was clearly at odds with the actions of the two space powers. As early as 1956, the United States Air Force was actively pursuing a military reconnaissance satellite capability.[212] In addition, military objectives and requirements, not civilian and scientific objectives were

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[209] See Bin Cheng, *Studies in International Space Law, supra* note 89 at 513.

[210] Ivan Vlasic "The Legal Aspects of Peaceful and Non-Peaceful Uses of Outer Space" ed. Bhupendra Jasani, *supra* note 78 at 45, where he states that "...the conclusion is inescapable that all military uses of space other than those prohibited by treaty were --- since the beginning of space exploration and still are today --- lawful as long as they do not violate any of the principles and rules of general international law (e.g., uses that represent the threat or employment of force). Also see Chapter 3 for a detailed discussion on *jus ad bellum* prior to and after the adoption of the UN Charter.

[211] Statement made by U.S. Ambassador John Lodge to the UN General Assembly in January 1957. Cited in, Ivan Vlasic "The Legal Aspects of Peaceful and Non-Peaceful Uses of Outer Space" *ibid* at 38. Vlasic also notes at 39 that in 1958 the U.S.S.R. proposed a ban on the use of outer space for military purposes.

[212] "The CORONA Program", *supra* note 11. See also "KH-1 CORONA," Global Security.Org, Online: <http://www.globalsecurity.org/space/systems/kh-1.htm> where it is reported that the CORONA program originated in a classified weapons system program awarded to Lockheed in 1957

the primary drivers of both the U.S. and the Soviet space programs.[213] This dichotomy led, in 1958, to a significant adjustment in the original U.S. position on "exclusively peaceful purposes", with the Americans moving away from the modifier "exclusively" in describing "peaceful purposes". The Americans also adopted an interpretation of "peaceful purposes" that allowed for military uses of outer space so long as those uses were "non-aggressive."[214] In other words, it was, and remains, the American position that "any military use [of space] is lawful so long as it does not violate Article 2(4) of the UN Charter, which prohibits "the threat or use of force", or Article IV of the Outer Space Treaty."[215] Article IV of course prohibits nuclear and other weapons of mass destruction in space, and demilitarizes the moon and other celestial bodies.[216]

The American position was rooted in the argument that military uses are not, by definition, non-peaceful purposes.[217] In fact, it is argued that many military uses can and do make a direct contribution to the maintenance

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[213], Ivan Vlasic "The Legal Aspects of Peaceful and Non-Peaceful Uses of Outer Space *supra* note 210 at 39, where the author discusses the primarily military nature of both the U.S. and Soviet space programs beginning as early as 1955.

[214] See Bin Cheng *Studies in International Space Law*, *supra* note 89 at 515 where he quotes from a statement made by Senator Gore to the United Nations First Committee on 3 December 1962, "It is the view of the United States that outer space should be used only for peaceful – that is non-aggressive and beneficial – purposes. The question of military activities in space cannot be divorced from the question of military activities on earth. To banish these activities in both environments we must continue our efforts for general and complete disarmament with adequate safeguards. Until this is achieved, the test for any space activities must not be whether it is military or non-military, but whether or not it is consistent with the United Nations Charter and other obligations of law."

[215] Elizabeth S. Waldrop, "Weaponization of Outer Space: US National Policy" (2004) XXIX Ann. Air & Sp. L. 229 at 339. Also see the Space Commission Report, *supra* note 12 at 36 where the U.S. interpretation of peaceful is restated as follows, "The U.S. and most other nations interpret "peaceful" to mean "non-aggressive"; this comports with customary international law allowing for routine military activities in outer space, as it does on the high seas and in international airspace."

[216] *Outer Space Treaty, supra* note 16.

[217]See for example Paul B. Stares, *The Militarization of Space: US Policy, 1945 – 1984, supra* note 196 at 55, where the author notes that "... the United States now promoted the view that space could and should be used only for 'peaceful' rather than 'nonmilitary' purposes, thus permitting the deployment of military satellites that were not in themselves weapons systems."

of peace.[218] The challenge presented by this interpretation is that "non-aggressive" uses are essentially determined subjectively, based upon intended uses, not capabilities, of a particular space object or system. As pointed out by Professor Vlasic, "then it follows logically – and absurdly – that all nuclear and chemical weapons are also peaceful as long as they are not used for aggressive purposes."[219] To date this subjective distinction between "aggressive" and "non-aggressive" uses has been avoided due simply to the fact that weapons have not been placed in space. Military uses have been restricted to uses not involving the direct application of force.

The alternative view interprets the "peaceful purposes" principle to exclude all military uses of space. This was the public position taken by the Soviets, despite their active use of space for military purposes.[220] This view sees space as being reserved solely for civil and scientific pursuits, relying on the ordinary meaning of the term "peaceful,"[221] and adopting a contextual approach to the interpretation of the term in accordance with Article 31 of the Vienna Convention on the Law of Treaties.[222]

Much of the analysis undertaken to address the meaning of the term "peaceful" in the Outer Space Treaty has involved a review of the usage

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[218] Successful disarmament and arms control programs require a robust verification system that demonstrates that parties are in compliance. See for example Ram S. Jakhu and Riccaredo Trecroce, "International Satellite Monitoring for Disarmament and Development" (1980) V. Ann. of Air and Sp. L. 509. Space based verification systems have proven to be highly effective in this regard.

[219] Vlasic "The Legal Aspects of Peaceful and Non-Peaceful Uses of Outer Space," *supra* note 166 at 45

[220] *Ibid* at 40. See also Richard A. Morgan, "Military Use Of Commercial Communication Satellites: A New Look At The Outer Space Treaty And 'Peaceful Purposes'" *supra* note 154 at 304 where he notes that the Soviet view "softened as their military satellite programs came to fruition."

[221] The Concise Oxford defines peaceful to mean "characterized by peace; belonging to a state of peace; not violating or infringing peace." Peace is defined to mean "freedom from or cessation of war". See J.B. Sykes ed. *The Concise Oxford Dictionary of Current English*, 7th ed. (Oxford: Oxford University Press, 1982)

[222] *Vienna Convention on the Law of Treaties*, *Supra* note 96.

of "peaceful" in other international instruments. The most oft cited instrument in this regard is the 1959 Antarctic Treaty,[223] the model upon which the "peaceful purposes" principle in the Outer Space Treaty was based.[224] Article 1 of the Antarctic Treaty states:

> "1. Antarctica shall be used for peaceful purposes only. There shall be prohibited, *inter alia*, any measure of a military nature, such as the establishment of military bases and fortifications, the carrying out of military manoeuvres, as well as the testing of any type of weapon.
>
> 2. The present Treaty shall not prevent the use of military personnel or equipment for scientific research or for any other peaceful purpose."

While Article 1 of the Antarctic Treaty has been credited with the demilitarization of Antarctica,[225] there are differences between it and the Outer Space Treaty. Firstly, with regards to the establishment of military facilities, the Outer Space Treaty only prohibits such activity on celestial bodies, including the moon. It does not prohibit such activity in outer space itself.[226] The Antarctic Treaty on the other hand, precisely defines the geographic region to which the treaty applies and, the Article I prohibition is applicable to the area as a whole.[227]

Secondly, unlike the Antarctic Treaty, the Outer Space Treaty expressly provides for the application of international law, including the UN Charter, to the exploration and use of outer space "in the interests of

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[223] The *Antarctic Treaty*, 1 December 1959, 402 U.N.T.S. 71 (entered into force 23 June 1961).
[224] Christopher M. Petras "The Debate Over the Weaponization of Space – A Military-Legal Conspectus" *supra* note 133 at 187.
[225] Vlasic, "The Legal Aspects of Peaceful and Non-Peaceful Uses of Outer Space" ed. Bhupendra Jasani, *supra* note 78 at 41.
[226] *Outer Space Treaty, supra* note 16, Article III.
[227] *Antarctic Treaty, supra* note 223, Article VI.

maintaining international peace and security".[228] One of the tools available to the United Nations Security Council for the purpose of maintaining international peace and security is the use of force, normally applied on behalf of the Security Council by member states.

Finally, state practice suggests that "peaceful purposes" as used in the Outer Space Treaty, does not equate to "non-military uses", or "demilitarization" of outer space. As discussed above,[229] subsequent state practice is one of the interpretative tools identified in Article 31 of the Vienna Convention on the Law of Treaties[230] and, the practice of "specially affected" states is considered to be particularly persuasive.[231] In the case of outer space, the U.S. and the U.S.S.R, have been the primary actors in the area over the last 50 years. As such, it is submitted that they qualify as "specially affected" states for the purposes of assessing practice. Both states have consistently and repeatedly used space for military purposes for more than 40 years.[232] In the case of the U.S., military uses have been pursued openly, relying upon a clearly articulated definition of "peaceful" that permits military uses. This practice, while dominated by the two space powers, has not been limited to them.[233] It is interesting to note that in the face of the American definition of "peaceful" and the open practice of military use, at least by the

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[228] *Outer Space Treaty, supra* note 16, Article III.
[229] See *supra* section 2.1.1 International Conventions or Treaties.
[230] *Vienna Convention on the Law of Treaties, supra* note 96.
[231] *North Sea Continental Shelf Case, supra* note 110.
[232] Vlasic, *supra* note 210 at 45 notes that "...not long after the adoption of the OST, outer space achieved the dubious distinction of being the most heavily militarized environment accessible to humans..."
[233] See for example "Security Above All Transforming Canada's Air Force", Online - Department of National Defence <http://www.airforce.forces.gc.ca/vision/index_e.asp>, where it is stated "[Canada's] exploitation of space is limited to communications, navigation, surveillance and warning, environmental monitoring and intelligence and reconnaissance activities."

U.S., there has never been any formal protest or denunciation of the American interpretation of "peaceful purpose" in the Outer Space Treaty.[234]

Despite the ambiguity of the term "peaceful" when used in isolation,[235] the context in which the term is used in the Outer Space Treaty, coupled with the practice of states, leads one to conclude that the term "peaceful purposes" in the Outer Space Treaty does not equate to "non-military purposes". Non-aggressive military uses of space for navigation, reconnaissance, communications etc., are, it is submitted, permitted in outer space. Whether or not "non-aggressive" uses extend to include the actual use of force in from or through space will be explored in the following chapter.[236]

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[234] Vlasic, "The Legal Aspects of Peaceful and Non-Peaceful Uses of Outer Space" *supra* note 210 at 45

[235] *Ibid* at 47, where the author concludes "Perhaps the most important lesson that can be drawn from the above survey and one that should be strongly impressed on governments is to avoid the imprecise term "peaceful" in all future arms limitation and disarmament agreements, unless the term is defined in each treaty with great precision."

[236] For further discussion on the interpretation of the term "peaceful purposes" see P.K. Menon, *The United Nation's Efforts to Outlaw the Arms Race in Outer Space*, (Lewiston, New York: Edwin Mellen Press, 1988), Chapter 3, were the author concludes by noting "Hence, both Space Powers are basically in agreement with the nature of the activity each one of them undertakes in outer space. Stated otherwise, both agree that outer space can be used for military purposes, so long as they are non-aggressive in character."

Chapter 3 The Conduct of Hostilities in Space

While the use of force in, from or through space is not expressly addressed in any of the international legal instruments discussed in Chapter 2, its use is regulated by international law.[237] Resort to the use of force in space is governed by general rules of international law subject, of course, to any limitations, restrictions or exclusions placed on the law arising out of the *lex specialis* of outer space.[238]

International law regulating the use of force[239] is split into two branches,[240] law that regulates the question of when states may resort to the use of force, referred to as *jus ad bellum,* and law that regulates the actual conduct of hostilities, *jus in bello.*[241] In effect, the use of force in international law is judged first on the legality of the reasons for opting to use it and then,

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[237] *The Outer Space Treaty*, *supra* note 16, Article III.

[238] For a discussion on *lex specialis* see "Fragmentation of International Law", International Law Commission Study Group on Fragmentation, Online: <http://www.un.org/law/ilc/sessions/55/fragmentation_outline.pdf> where a discussion of the principle of the application of specific rules and norms overriding those of general application can be found.

[239] International law relating to the use of force variously describes the applicable law as the "laws of war", "law of armed conflict", and "international humanitarian law". These descriptors are generally used to refer to the rules governing the conduct of actual armed conflict (see for example Adam Roberts and Richard Guelff ed., *Documents on the Laws of War*, 3rd ed. (Oxford: Oxford University Press, 2000) at 1. Canadian Forces doctrine defines the Law of Armed Conflict as follows "The LOAC, considered in the broadest sense, determines when states may resort to the use of armed force and how they may conduct hostilities during armed conflicts. This guide is concerned primarily with the LOAC in the narrow sense, that is, with the body of law that governs the conduct of hostilities during an armed conflict." See the *Law of Armed Conflict at the Operational and Tactical Levels,* Canadian Forces Publication, B-GJ-005-104/FP-021, 13 August 2001.

[240] L.C. Green, *The Contemporary Law of Armed Conflict, supra* note 164 at 15.

[241] Adam Roberts and Richard Guelff ed., *supra* note 239 at 1. The *jus in bello* is found in both customary and conventional international law. Codification efforts have been pursued in two streams, the Hague and Geneva streams, which are described in *Law of Armed Conflict at the Operational and Tactical Levels, ibid* at 1-1 as follows "The Law of The Hague is concerned essentially with the actual conduct of military operations including the methods and means of combat. The Law of Geneva on the other hand is concerned with the protection of persons not involved in a conflict such as civilians, PWs and the sick and wounded. Following the adoption in 1977 of the Additional Protocols I and II to the Geneva Conventions, there has been a tendency for the two components to merge as the Additional Protocols deal with the conduct of hostilities as well as the protection of the victims of armed conflict."

independently of the decision to use force, the manner in which the belligerents conduct themselves during the conflict.[242] An unauthorized or illegal use of force in no way vitiates the responsibility of belligerent states to comply with their obligations under the *jus in bello*.[243] This analysis focuses on the *jus ad bellum,* or the norms regulating a decision to use force in outer space. The means by which force may be employed will only be briefly discussed.[244]

3.1 ***Jus ad Bellum – An Overview***

3.1.1 Pre- United Nations Charter

The law relating to the use and application of force traces its roots to the earliest human civilizations, with the law developing and changing to reflect the values and principles of evolving civilizations.[245] Today, the regulation of when and how force can be applied reflects the most fundamental of state obligations within the international community.[246]

A review of the evolution of the history of the use of force reveals two almost universal constants. First, all societies, regardless of their state of

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[242] Michel Bourbonniére, "Law of Armed Conflict (LOAC) and the Neutralisation of Satellites or *Ius in Bello Satellitis*" (2004) Vol 9 No. 1 Journal of Conflict and Security Law 43 at 44, where the author notes that "International public law judges the use of force twice. Firstly international public law establishes norms, which apply to the decision to use force. ... Secondly international public law contains a set of norms that determine the manner in which force may legitimately be applied."
[243] Adam Roberts and Richard Guelff ed., *supra* note 239 at 1.
[244] For a discussion of the *jus in bello* issues relating to space see Robert A. Ramey, "Armed Conflict on the Final Frontier: The Law of War in Space" *supra* note 32 at 34 and Michel Bourbonniére, "Law of Armed Conflict (LOAC) and the Neutralisation of Satellites or *Ius in Bello Satellitis*" *supra* note 242.
[245] For a detailed overview of the history of *Jus ad Bellum* see Ian Brownlie, *International Law and the Use of Force by States*, (London: Oxford University Press, 1963) Part I. For an overview of the development of *Jus in Bello* see L.C. Green, *The Contemporary Law of Armed Conflict, supra* note 164 Chapter 2.
[246] M Dixon, *Textbook on International Law, supra* 98 at 276

development and civilization, have been prepared to resort to war. Secondly, societies have consistently developed some legal construct upon which resort to war has been justified.[247] Brownlie, in his seminal work on the use of force by states, reports that one notable exception to this was early Christian doctrine, which forbade Christians from engaging in warfare on the basis that war could never be justified.[248] This clear denunciation of war evolved over time, with the Christian church ultimately articulating the "just war" theory, recognizing that, in some circumstances, war was acceptable and perhaps even necessary.[249]

While the articulation of what circumstances warranted "just war" varied, the just war doctrine continued to be the primary basis for articulating the legality of war until the 17th century. The rise of the nation state in Europe coupled with the doctrine of sovereign equality of states - "states are free to behave as they please" [250]- saw the application of the just war doctrine evolve into a subjective state determination of what was just. This essentially relegated the doctrine of just war to the "realms of morality or propaganda", where both sides could argue the subjective justness of their cause.[251] This, in turn, led to an unrestricted right of war for any reason. It was, however,

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[247] Ian Brownlie, *International Law and the Use of Force by States, supra* note 245 at 3, where the author notes that while the reasons for war in ancient societies were often slight, "It was rare for advanced societies to leave war unregulated."
[248] *Ibid* at 5
[249] *Ibid* at 5, where it is noted that the circumstances justifying war are vaguely defined but include wars God himself ordains. See also M Dixon, *Textbook on International Law, supra* 98 at 277 where he states that "A just cause encompassed a variety of situations, but essentially involved a wrong received or a right illegally denied."
[250] L.C. Green, *International Law A Canadian Perspective,* 2nd ed. (Toronto: Carswell Company Ltd., 1988) at 110
[251] Ian Brownlie, *International Law and the Use of Force by States, supra* note 245 at 14.

generally understood that war was to be employed as a means of last resort.[252]

This unrestricted right to wage war made justification of war unnecessary. States cited self-preservation, self-defence and necessity as reasons for the use of force between the seventeenth and early twentieth centuries, however, as noted by Dixon, these justifications were "legally meaningless," as they were not exceptions to a general prohibition against the use of force.[253] Although not legally relevant, the developing practice of states to classify their use of force based on underlying state objectives, including the use of force in self-defence, provided the underpinnings upon which exceptions to the general prohibitions on the use of force adopted by the international community in the twentieth century were based.[254]

The experience of the First World War provided the impetus necessary for the international community to pursue, on a broad multi-lateral basis, restrictions on the right of states to wage war. The Covenant of the League of Nations,[255] while not prohibiting war, imposed procedural obligations on signatory states aimed at achieving peaceful settlement of disputes. These procedural obligations had to be satisfied before a state could resort to war. It

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[252] *Ibid*

[253] M Dixon, *Textbook on International Law, supra* 98 at 278

[254] *Ibid* at 278. Also see Ian Brownlie, *International Law and the Use of Force by States, supra* note 245 at 43, where the self defence criteria arising out of the Caroline Incident are discussed and Brownlie notes that "The formula used by Webster has proved valuable in recent years but the correspondence made no difference to the legal doctrine, such as it was at the time."

[255] *Covenant of the League of Nations* (June 1919) 112 British Foreign Service Papers p1. Membership was not universal, in particular neither the U.S. nor the U.S.S.R. were parties to the Convention.

was under this regime that the right of self-defence began to emerge as an exception to the legal restrictions on the right to use force.[256]

The General Treaty for the Renunciation of War (Kellogg-Briand Pact) was signed in 1928.[257] Still in force today,[258] the Kellogg-Briand Pact was the first attempt by the international community to "condemn recourse to war for the solution of international controversies."[259] The parties agreed that, "the settlement or solution of all disputes or conflicts ... shall never be sought except by pacific means."[260]

The Kellog-Briand Pact was not successful in its objective of eliminating war, due primarily to the highly technical definition of "war" that had evolved within the international community. However, the Pact did play a key role in establishing, as a principle of customary international law, the illegality of war as an instrument of national policy, subject to an exception for self-defence.[261] It also set the stage for the adoption of the UN Charter at the end of World War II.[262]

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[256] See L.C. Green, *The Contemporary Law of Armed Conflict, supra* note 164 at 5, and M Dixon, *Textbook on International Law, supra* 98 at 278.
[257] *General Treaty for the Renunciation of War (as an Instrument of National Policy)* 27 August 1928, Can T.S. 1929 No. 7 (In force 24 July 1929) (hereinafter Kellog-Briand Pact).
[258] 71 states have ratified or adhered to the Kellog-Briand Pact. For a listing see "Canada Treaty List", Online: Department of Foreign Affairs and International Trade <http://www.treaty-accord.gc.ca/Treaties_CLF/Details.asp?Treaty_ID=104163>
[259] Kellog-Briand Pact, *supra* note 257 Article 1.
[260] *Ibid*, Article 2.
[261] Ian Brownlie, *International Law and the Use of Force by States, supra* note 245 at 110. See also M Dixon, *Textbook on International Law, supra* 98 at 279 who notes that the Kellog-Briand Pact did not amount to a general prohibition on the use of force but rather was a ban on war, a highly technical term that did not capture all uses of force. In addition, he expresses the view that the ban on war did not extend to self-defence, reprisals, rescue of nationals, or humanitarian intervention, because these were uses of force short of war or, alternatively were exceptions to the general ban.
[262] *Charter of the United Nations, supra* note 179.

3.1.2 Post United Nations Charter

One of the primary purposes of the UN is the maintenance of international peace and security.[263] In furtherance of this purpose, Article 2(4) of the Charter states:

> "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."

Article 2(4) is a comprehensive prohibition[264] against both the actual and threatened "use of force" by member states in the conduct of their international affairs.[265] This prohibition is complimented by the requirement that member States settle their disputes through peaceful means.[266] The UN Charter sets out a process for pacific dispute resolution.[267] The comprehensive prohibition against the use of aggressive force by states is also found in customary international law, operating parallel to, but independently of, the prohibition contained in the UN Charter.[268]

The prohibition against the use of force both in the UN Charter and customary international law, while comprehensive, is not absolute. The UN

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[263] *Ibid* Article 1.

[264] See Dinstein, Y, *War, Aggression and Self Defence* (Great Britain: Cambridge University Press, 1991) at 84, who notes that the UN Charter prohibition is more comprehensive than that provided for in the Kellog-Briand Pact, which prohibited "war, leaving all other uses of force short of war lawful". See also Oscar Schachter, "The Right of States to Use Armed Force" (1984) Michigan Law Review 1620 at 1624 for a detailed discussion on the interpretation and meaning of Article 2(4).

[265] While this view is widely accepted and reflects state practice in the years following the adoption of the UN Charter, some have argued that Article 2(4) must be read very narrowly, only restricting the use of force to those circumstances where its use is directed against the territorial integrity or political independence of a state, or is contrary to the purposes of the UN. See M Dixon, *Textbook on International Law, supra* 98 at 281 – 282, citing Bowett, D.W. *Self Defence in International Law* (Manchester: Manchester University Press, 1958).

[266] *Charter of the United Nations, supra* note 179, Article 2(3)

[267] *Ibid* Chapter VI. Article 33 reiterates the peaceful resolution obligation found in Article 2(3), requiring that States adopt a peaceful means of their choice to resolve any dispute likely to endanger international peace and security.

[268] See *Military Activities In and Against Nicaragua, supra* note 94 at paragraphs 188 – 190.

Charter expressly provides for two exceptions, the right of individual states, acting individually or collectively, to use force in self-defence,[269] and the authority granted to the Security Council to authorize the use of force to "maintain or restore international peace and security".[270]

3.1.2.1 Self Defence

Self-defence, in the international forum, is the lawful resort to force undertaken by a state in response to an actual or imminent unlawful use of force against the state.[271] As discussed above, while the concept has a long history in international affairs, it was the adoption of the prohibition against the use of force in the early twentieth century that made the doctrine of self-defence legally relevant.[272] The right to use force in self-defence in customary international law is subject to three conditions, necessity, proportionality and immediacy.[273] Today, the right[274] is recognized in the UN Charter, which provides:

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[269] *Charter of the United Nations*, *supra* note 179, Article 51.
[270] *Ibid* Article 42
[271] See Dinstein, Y, *War, Aggression and Self Defence*, *supra* note 264 at 175 where the author describes self defence as a self help remedy available to states when their rights are violated.
[272] See *supra* note 253 and accompanying text.
[273] These three conditions are derived from the correspondence exchanged between the United States and Great Britain after the 1837 Caroline incident, where the American Secretary of State wrote, "It will be for... [Her Majesty's] Government to show a necessity of self defence, instant, overwhelming, leaving no choice of means, and no moment for deliberation. It will be for it to show, also, that the local authorities of Canada, even supposing the necessity of the moment authorized them to enter the territories of The United States at all, did nothing unreasonable or excessive; since the act, justified by the necessity of self defence, must be limited by that necessity and kept clearly within it." Letter from Daniel Webster to Lord Ashburton (August 6, 1842) quoted in Kindred et al *International Law Chiefly as Interpreted and Applied in Canada, supra* note 90 at 1125. For a discussion on the application of the doctrine of self defence in the context of the American response immediately after the September 11 2001 attacks see Christopher Greenwood, "International Law and the "War against Terrorism" (2002) *International Affairs* 78, no. 2, 301 at 309.
[274] Dinstein notes that some early publicists claimed that self-defence against unlawful uses of force was not only a right, but also a duty of states. Dinstien rejects this, noting that nothing in international law obligates states to respond to unlawful uses of force. See Dinstein, Y, *War, Aggression and Self Defence*, *supra* note 264 at 178.

> "Nothing in the present Charter shall impair the inherent right of individual or collective self defence if an armed attack occurs against a member of the United Nations, until the Security Council has taken measures necessary to maintain international peace and security. Measures taken by members in the exercise of this right of self defence 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 to maintain or restore international peace and security."[275]

While the principle is expressly recognized in the UN Charter, it is not without controversy. The right, as expressed in Article 51, is in reference to "self defence if an armed attack occurs." This has led to disagreement over the scope of the right. Is it limited to those circumstances in which an armed attack has actually commenced? Does it allow for self-defence where an attack has not yet commenced but is imminent? Or, does it allow anticipatory self-defence against attacks that may occur?

Those supporting a restrictive interpretation of Article 51 argue that the language used was carefully chosen to circumscribe the circumstances in which the use of force was available to member states. In effect, the authority to use force, without Security Council oversight, is limited to the very narrow circumstance where an armed attack occurs. Those advocating a restrictive interpretation note, for example, that Article 51 does not use the term "aggression"[276] to describe when the right to self-defence is triggered, a term

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[275] *Charter of the United Nations*, *supra* note 179, Article 51.

[276] See *Definition of Aggression*, GA Res. 3314(XXIX) (1974) where the UN General Assembly has provided a consensus definition of aggression. Article 1 states that "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."

used elsewhere in the Charter[277] when referring to prohibited state activity. In other words, it is argued that, while the UN Charter prohibits all forms of aggression, member states may only exercise their right of self-defence when the aggression manifests itself in the form of an armed attack. Aggression falling short of this, for example the threat to use force, while unlawful, does not trigger the right to respond to the threat by the use force in self-defence.[278]

Dinstien, supports the view that the wording of the UN Charter, and Article 51 in particular, limits the right to use force to those circumstances where an armed attack has occurred.[279] However, he has adopted a broader interpretation of the meaning of "armed attack". He accepts that threats of an armed attack, while sufficient under customary international law to justify the use of force in self-defence, do not satisfy the "armed attack" requirement imposed upon UN member states. He does, however, argue that the armed attack requirement in Article 51 might well be satisfied prior to the actual delivery of the unlawful force. He argues that the real test of whether an armed attack has occurred is whether the aggressor has embarked on an "irreversible course of action"[280] in furtherance of an armed attack. He describes this situation as an "incipient armed attack," triggering the right of "interceptive" self defence under Article 51. "Interceptive self defence" is distinguished from anticipatory self-defence on the basis that interceptive self-

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[277] *Charter of the United Nations*, *supra* note 179. Article 1(1) refers to "suppression of acts of aggression", Article 39, provides that the Security Council "shall determine the existence of any threat to the peace, breach of the peace or act of aggression," and Chapter VII is entitled "Action With Respect to Threats to the Peace, Breaches of the Peace and Acts of Aggression."

[278] See for example Ian Brownlie, *International Law and the Use of Force by States*, *supra* note 245 at 278 where he states "It can only be concluded that the view that Article 51 does not permit anticipatory action is correct and that the arguments to the contrary are either unconvincing or based on inconclusive pieces of evidence."

[279] Dinstein, Y, *War, Aggression and Self Defence*, *supra* note 264 at 183

[280] *Ibid* at 190.

defence responds to armed attacks that are "imminent" and "practically unavoidable." Anticipatory self-defence, on the other hand, responds to threats of aggression.[281]

Those who argue that anticipatory self-defence remains available to states under Article 51, take the view that Article 51 preserves the customary law in the area of self-defence.[282] This argument seeks to interpret the meaning of the use of the phrase "inherent right of self-defence". Use of the adjective "inherent" in Article 51 must, the argument goes, be intended to refer to the customary law relating to self defence, otherwise the term is superfluous in the context of the Article. The inherent right of self-defence allows states to respond to not only armed attacks but also threats of imminent attacks. To use the language arising out of the Caroline incident, use of force in self defence is permitted when an attack is, "instant, overwhelming, leaving no choice of means, and no moment for deliberation."[283] It is argued that to interpret Article 51 otherwise, and require the victim state to absorb the first blow, would be contrary to the purposes of the UN Charter.[284] Those favouring this interpretation note that the reference to "armed attack" in Article 51 was not intended to be restrictive, but rather was simply intended to

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[281] *Ibid* at 190 – 191. See also at 183. The author acknowledges that a detailed review of all of the facts is required to ascertain the legitimacy of a claim of interceptive self defence. He cites the 1967 "Six Day War" as an example where the Israelis were the first to use force, raising a *prima facie* presumption that they were the unlawful aggressors. However a detailed analysis of all of the facts surrounding Egypt's preparations for war would lead one to conclude that Egypt was committed to an armed attack, the only question being when, not if, a conflict would commence. These circumstances would be sufficient to rebut the prima facie presumption of aggression, as Israel was acting in interceptive self defence.

[282] L.C. Green *Essays on the Modern Law of War* 2nd ed. (New York: Transnational Publishers, 1999) at 121

[283] See *supra,* note 273

[284] L.C. Green *Essays on the Modern Law of War. supra,* note 282 at 124.

recognize and safeguard mutual defence clauses in other international instruments.[285]

The aftermath of the terrorist attacks on the United States in September 2001 has seen the emergence of a new strategic doctrine within the U.S.[286] This doctrine articulates a right of preventative or pre-emptive self-defence. The pre-emptive doctrine is reflected in the National Security Strategy Paper issued by the White House in 2002:

> The United States has long maintained the option of preemptive actions to counter a sufficient threat to our national security. The greater the threat, the greater is the risk of inaction— and the more compelling the case for taking anticipatory action to defend ourselves, even if uncertainty remains as to the time and place of the enemy's attack. To forestall or prevent such hostile acts by our adversaries, the United States will, if necessary, act preemptively."[287]

While the arguments in support of anticipatory self defence and interceptive self-defence may differ in degree, both recognize that justification for the use of force in self-defence requires that an attack be imminent. The American pre-emption doctrine appears to expand the traditional requirement for an "imminent attack" to include those situations of potential danger where an adversary may initiate an attack at some undefined point in the future.[288] The doctrine significantly loosens the current restraints placed on the use of force in international law, allowing for the use of force to deal with "emerging threats before they are fully formed."[289] While a pre-emptive approach to the

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[285] See Oscar Schachter, "The Right of States to Use Armed Force" *supra* note 264 at 1633, where the author notes that "The drafting history shows that article 51 was intended to safeguard the Chapultepec Treaty which provided for collective defence in the case of armed attack."
[286] Richard N. Gardner, "Neither Bush nor the Jurisprudes", (2003) 97 AJIL 585.
[287] "National Security Strategy of the United States of America," September 2002, Section V, Online - The White House <http://www.whitehouse.gov/nsc/nss.html>.
[288] Richard N. Gardner, "Neither Bush nor the Jurisprudes", *supra* note 286 at 588.
[289] "National Security Strategy of the United States of America," *supra* note 287, Introduction.

use of force may well be seen as a tool to enhance American security, it also poses significant risks. The pre-emption doctrine articulated by the American government might well provide states with a legal justification to take what would otherwise be aggressive action against neighbours who do not share their ideological, social or political views.[290]

3.1.3 Current State of the Law

The current state of the law relating to *jus ad bellum* prohibits states from using or threatening to use force in the conduct of their international relations. This prohibition is found in the UN Charter and has also been held to exist in customary international law. All states are therefore subject to the same prohibition on the use of force, whether they are UN member states or not.[291]

The UN Charter provides for two express exceptions to the prohibition against the use of force, self-defence, both individual and collective,[292] and situations where the Security Council authorizes the use of force to maintain or restore international peace and security.[293] The scope of the right to use force in self-defence pursuant to the UN Charter has generated significant debate, with some asserting the right exists only in the event of actual armed attack

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[290] Richard N. Gardner, "Neither Bush nor the Jurisprudes" *supra* note 286 at 588 notes that "...such a doctrine would legitimize preemtive attacks by Arab countries against Israel, by China against Taiwan, by India against Pakistan, and by North Korea against South Korea. It would even serve to legitimize ex post facto Japan's attack on Pearl Harbor."
[291] *Charter of the United Nations, supra* note 179, Article 2(4) and *Military Activities In and Against Nicaragua, supra* note 94 at paras 188 – 190.
[292] *Charter of the United Nations, ibid*, Article 51.
[293] *Ibid*, Chapter VII.

and others taking the view that the UN Charter has preserved the right of anticipatory self defence as it exists in customary international law.[294]

In the aftermath of the September 11, 2001 terrorist attacks on the U.S., the Americans have taken an expansive view of the doctrine of anticipatory self-defence adopting the pre-emptive self-defence doctrine. Pre-emption effectively discards the requirement for an imminent threat to exist before self-defence becomes available. The effect of this is to allow for states to resort to the use of force in self-defence in response to developing threats.[295]

It is in this legal environment that the use of force in outer space will be considered.

3.2 Jus Ad Bellum in the Space Environment

The use of force on the surface of the earth and in the atmosphere is clearly permitted in the limited circumstances provided for in international law.

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[294] In addition to the authority to use force in self defence, there is *de lege ferenda* to the effect that there exists a right to use force in other specific circumstances, including the protection of nationals abroad and for humanitarian intervention in cases of a humanitarian emergency involving large scale loss of life. For a discussion on the authority to use force in cases warranting humanitarian intervention, see Christopher Greenwood, "International Law and the NATO Intervention in Kosovo" (2000) 49 International and Comparative Law Quarterly 926 at 931, where the author states: "In my opinion modern customary international law does not exclude all possibility of military intervention on humanitarian grounds by states, or by an organisation like NATO. It does, however, treat the right of humanitarian intervention as a matter of last resort and confines it to extreme cases, where the following conditions are satisfied:

(a) that there exists – or there is an immediate threat of – the most serious humanitarian emergency involving large scale loss of life; and
(b) military intervention is necessary, in that it is the only practicable means by which loss of life can be ended or prevented.

These are objective criteria and, in determining whether they are met in any individual case, the existence of authoritative and impartial acceptance of the existence of an emergency and the need for military action is obviously of great importance." Recognition of the right of the UN Member States to use force in these circumstances implies that the right for Member States to resort to the use of force is broader than has been traditionally recognized under the UN Charter. In other words the lawful use of force is not limited to situations of self defence under Article 51 and situations where the Security Council has authorized the use of force.

[295] "National Security Strategy of the United States of America," *supra* note 287.

However, it is not universally accepted that the same rights to use force extend into outer space.[296]

3.2.1 The Argument Against the Use of Force in Space

One writer, commenting on the authority to use force in international law and its applicability in space, has stated "however, many principles of international law, as they are today *e.g.* those concerning appropriation of unclaimed territories, and provisions of the United Nations Charter *e.g.* those concerning the use of force in certain exceptional circumstances like self-defence, cannot and should not be made applicable to outer space."[297] A second commentator noted, when addressing the application of Article 51 of the UN Charter in the space environment, that it "has been neutralized by the rule of Art[icle] 1, par[agraph] 1 of the [1967 Outer] Space Treaty, which may be considered as a *lex specialis* in this matter."[298] In other words, space law excludes the doctrine of self-defence in the outer space environment.

The underlying basis of this argument involves an interpretation of the Outer Space Treaty, based upon its underlying objectives. The Vienna Convention on the Law of Treaties[299] provides that the preamble and annexes of a Treaty can be relied upon to determine context, for the purpose of interpretation. The preamble of the Outer Space Treaty, it is argued, demonstrates that the drafters of the Treaty envisioned only non-military uses of space and, that this vision is further expressed in the principles set out in

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[296] See for example Bruce Hurwitz, *The Legality of Space Militarization, supra* note 112 at 71, where Hurwitz states "According to Markov, Article 51 of the U.N. Charter "has been neutralized"

[297] M Chandrasekharan, "The Space Treaty" (1967) 7 Indian Journal of Int'l Law 61 at 63

[298] Marko G. Markov, "Against the So-Called 'Broader' Interpretation of the Term 'Peaceful' in International Space Law," (1968) Proceedings of the Eleventh Colloquium on the Law of Outer Space at 79, cited by Bruce Hurwitz, *The Legality of Space Militarization, supra* note 112 at 71.

[299] *Vienna Convention on the Law of Treaties*, *supra* note 96, Art 31(2).

body of the Treaty. For example, Article I of the Outer Space Treaty provides that: (1) the exploration and use of outer space shall be carried out for the benefit and in the interests of all; (2) outer space shall be the province of all mankind; (3) outer space shall be free for exploration and use by all; (4) that there shall be free access to all areas of celestial bodies; (5) that there shall be freedom of scientific investigation; and (6) international cooperation shall be facilitated and encouraged in the conduct of scientific investigation.[300] Thus while Article IV of the Outer Space Treaty speaks to the military uses of space, Article IV must, it is argued, be interpreted in the context of both the Preamble and Article I of the Treaty. This contextual approach to interpretation does not require an express prohibition against all uses of force in space. The prohibition, while implied, necessarily flows from the Preamble and the Article 1 principles. Article IV, it is argued, reinforces the underlying principles of the Treaty by providing an illustrative, but by no means exhaustive, list of prohibited military activities. Those favouring this argument reject the old international law principle that "everything not expressly prohibited in international law is permitted",[301] in favour of the view that freedom of action is limited by the rights of other states.[302] In the case of the outer space environment, the rights of states as provided for in the Outer Space Treaty are inconsistent with the use of force, for any purpose.[303] While there is merit in

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[300] *The Outer Space Treaty*, *supra* note 16, Article 1.
[301] Lucie Stojak, "Legally Permissible Scope of Current Military Activities in Space and Prospects for Their Future Control" (D.C.L. Thesis, McGill University, 1986) 186.
[302] The principle that the legal rights of others limit how your legal rights may be exercised has been generally recognized in international law and is described as the doctrine of "abuse of rights". See *infra* note 369 and the accompanying text for a brief overview of the doctrine, its potential application in the outer space context and references to more detailed analysis of the doctrine and its application in international law.
[303] *Ibid* at 188, citing Dr. Manfred Lachs, International Academy of Astronautics Doc. IAA/SCi L. Ctee II 1970, pp 2-3.

the above argument, it is not reflective of state practice in the years since the coming into force of the Outer Space Treaty.[304]

3.2.2 The Argument For the Use of Force in Space

Article III of the Outer Space Treaty expressly extends the application of international law, including the UN Charter, to activities in outer space.[305] However, as noted by Chandrasekharan,[306] this cannot amount to a total incorporation of international law since certain elements of international law are inconsistent with the *lex specialis* of outer space. Chandrasekharan cites both the law relating to national appropriation and the right to use force as examples of international law principles that are not incorporated into international space law.[307] In light of Chandrasekharan view that these two aspects of international law do not form part of the law of outer space it might be instructive to consider how the Outer Space Treaty addresses the issues of national appropriation and the use of force.

With respect to the question of national appropriation, the drafters of the Treaty did not rely on the Preamble and Article 1 to imply that the national appropriation of space would be inconsistent with the purposes and intent of the Outer Space Treaty. Instead, Article II of the Outer Space Treaty is devoted to the question of national appropriation in space, providing:

> "Outer Space, including the moon and other celestial bodies, is not subject to national appropriation by

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[304] Both of the major space powers have and continue to reserve the right to exercise their right to use force in self defence in outer space. See *infra* notes 330 and 331.
[305] *Outer Space Treaty supra* note 16, Article III.
[306] M Chandrasekharan, "The Space Treaty" *supra* note 297 at 63.
[307] *Ibid* at 63.

> claim of sovereignty, by means of use, or occupation, or by any other means."[308]

Article II is a comprehensive provision that clearly and expressly bars all forms of national appropriation in space. The language ensures that all known forms and, any future forms, of appropriation under international law are prohibited.[309] The Treaty language is a clear and express prohibition, and the prohibition is fully consistent with the principles enunciated in both the Preamble and Article 1 of the Treaty. In the circumstances, it would be difficult to disagree with Chandrasekharan's assertion that international law, as it relates to national appropriation, does not form part of international outer space law.

When one considers international law, as it relates to the use of force (*jus ad bellum*), the Outer Space Treaty is not nearly as clear and precise. It is well recognized that international law generally[310] and, the UN Charter specifically, recognizes the right of states to respond to the unlawful use of force, relying on the right of inherent self-defence.[311]

The concept of self-defence is a fundamental principle in international law. In correspondence from the Government of the United States, inviting other Governments to become parties to the Kellog-Briand Pact, the following statement is made regarding self-defence:[312]

> "There is nothing in the American draft of an antiwar treaty which restricts or impairs in any way the right of self-defense. *That right is inherent in every sovereign*

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[308] Outer Space Treaty *supra* note 16, Article II.
[309] See Ram Jakhu, "Acquisition and Retention of Property Rights in Outer Space" (copy on file with the author)
[310] *Military Activities In and Against Nicaragua, supra* note 94 at paragraph 94.
[311] *Charter of the United Nations, supra* note 179, Article 51.
[312] Kellog-Briand Pact, *supra* note 257

state and is implicit in every treaty."[313] (emphasis added)

If the American position is correct[314] in this regard then, undoubtedly, the right to act in self-defence in outer space is not and, in fact, could not be displaced by the Outer Space Treaty. However, Dinstein notes that in his view it is legally possible for states to agree to surrender their sovereign right to act in self-defence, in the same way they have surrendered their sovereign right to wage war. In such a circumstance, states might choose, for example, to rely on an international military force to address all acts of aggression.[315] It might be argued, that to some extent, Article 51 of the UN Charter already does this by providing that member states retain their right to act in self defence only until the point that the Security Council has taken "necessary measures".[316]

Dinstein's views in this regard are not universally shared.[317] However, if he is correct in his assertion that a state or group of states can contract out of their inherent right to exercise individual and collective self defence, it is submitted that the surrendering of such a fundamental right would require clear unequivocal language of the intent to do so. When States surrendered their right to wage war they did not do so by implication, or rely on language that was subject to interpretation. Both the Kellog-Briand Pact[318]

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[313] United States, Identic Notes, 1928, 22 A.J.I.L., Supp., 109, *id* (1928), quoted in Dinstein, Y, *War, Aggression and Self Defence*, *supra* note 264 at 180.
[314] See Haeck, Louis, "Aspects Juridiques de Certaines Utilisations Militaires de l'Espace" (1996) XXI-I Ann Air & Sp. L. 98 at 103, where the author, in an English language summary of the article notes "It can be said that the right of self defence is implicit in all treaties entered into by a sovereign state."
[315] Dinstein, Y, *War, Aggression and Self Defence*, *ibid* at 181
[316] UN Charter *supra* note 179 Article 51, which provides in part that "Nothing in the present Charter shall impair the inherent right of individual or collective self-defence if an armed attack occurs against a member of the United Nations, until the Security Council has taken measures necessary to maintain international peace and security."
[317] Dinstein, Y, *War, Aggression and Self Defence*, *supra* note 264 at 181, citing R. Ago, "Addendum to Eighth Report on State Responsibility", [1980] II (1) I.L.C. Ybk 13,53.
[318] Kellog-Briand Pact *supra,* note 257.

and the UN Charter[319] set out, in clear and express terms that States will refrain from the threat or use of force in the conduct of their international relations.

The drafters of the Outer Space Treaty adopted clear and unequivocal language to prohibit national appropriation of outer space, but they did not do so with respect to the use of force. Instead, the drafters adopted Article IV, which bans certain weapons from space, and partially demilitarizes the outer space environment.[320] Article IV is far from being an express prohibition against the use of all force in outer space. Any general prohibition can therefore only be implied after considering the underlying principles of the Treaty. As noted above, these principles can be relied upon to support the conclusion that the use of force in outer space is inconsistent with the principles, but this is certainly not the only conclusion one might reach. It is, at least, arguable that the lawful exercise of the right of self-defence in outer space is neither contrary to, nor does it undermine, the other underlying principles of the Treaty. The ability of individual states to respond to interference with their space based assets and for the international community to police activities and enforce international law might well be seen as enhancing, rather than undermining, principles such as "freedom of use and access", "non-appropriation" and "use for the benefit and in the interests of all".[321]

It is also important to note that if one accepts that the Outer Space Treaty renders all uses of force unlawful, then it not only renders the use of

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[319] *Charter of the United Nations*, *supra* note 179, Article 2(4).
[320] See *supra,* section "2.2.1 Outer Space Treaty" for a discussion of the arms control and demilitarization aspects of the Outer Space Treaty.
[321] See for example Louis Haeck, "Disarmament Law and International Order in Outer Space" (1997) XXII-I Ann Air & Sp. L. 559 at 575.

force in self-defence unlawful but would also, presumably, prevent the Security Council from exercising its authority to authorize the use of force in an appropriate situation.[322] If this were the case, the ability of the Security Council to address any threat to the peace, breach of the peace, or act of aggression,[323] originating from or being executed in outer space, would be limited to measures not involving the use of armed force.[324] Presumably, in such a situation, any "All Necessary Means Resolution"[325] would have to exclude the use of force in space. This would be the result even if a weapons system or key support system is located in space and, even if the system itself violates the terms of the Outer Space Treaty, or some other international agreement.[326] Such a situation, it is submitted, would amount to an abdication of the role of the Security Council in the maintenance of international peace and security.[327]

Fear of abuse might also form the basis for an objection to the use of force in self-defence in outer space. One respected legal scholar noted the following in the context of an objection to the recognition of the doctrine of humanitarian intervention on the basis of potential abuse:

> "This is, of course, a policy objection, rather than a reason for asserting that there is no right of humanitarian intervention in existing law. Moreover, it

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[322] *Charter of the United Nations*, *supra* note 179, Chapter VII.
[323] *Ibid*, Article 39.
[324] *Ibid*, Article 41.
[325] See M Dixon, *Textbook on International Law, supra* note 98 at 298, where the author notes that the Security Council has not functioned as originally envisioned due to the fact that agreements to make armed forces available to the UN pursuant to Article 43 have never been reached. Nonetheless, the Security Council has been able to authorize the use of force to restore or maintain international peace and security by authorizing member states individually, or through regional security organizations to take "All Necessary Means" to accomplish stated Security Council objectives in a given situation. "All Necessary Means" includes the use of force.
[326] For example if a state were to place a nuclear weapon in orbit contrary to Article IV of the Outer Space Treaty , a prohibition on the use of all force in space would ultimately prevent the Security Council form authorizing the destruction of the weapon.
[327] *Charter of the United Nations*, *supra* note 179, Article 39.

> is not persuasive. All rights are capable of being abused. The right of self defence has undoubtedly been the subject of abuse but it is never seriously suggested that international law should not include the right of a State to defend itself. The fact that a state may make an unfounded claim to intervene in a bad case is not a sufficient reason for denying all states the right of intervention in cases where the objective conditions for intervention are met."[328]

The fear of abuse might well be a legitimate objection to allowing the development, or continuation, of a legal rule or norm. However, fear of abuse itself does not nullify the norm or rule in question. The options available in such a situation are to take action against the abuser or take positive steps to reform the law to lessen the possibility of abuse.

As noted above, the practice of the two historical space powers also indicates that they do not interpret the Outer Space Treaty as prohibiting the lawful use of force in outer space.[329] The U.S. Department of Defence Space Policy Directive states the following with respect to the use of force in self defence:

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[328] Christopher Greenwood, "International Law and the NATO Intervention in Kosovo" *supra* note 294 at 931.

[329] See for example Christopher M. Petras, "The Use of Force in Response to Cyber-Attack on Commercial Space Systems – Reexamining 'Self Defense' in Outer Space in Light of the Convergence of U.S. Military and Commercial Space Activities" 67 J. Air L. & Com. 1213 at 1255. The author, relying on Article 2(4) of the UN Charter, concludes that it is unlawful to harmfully interfere with the space assets of another State. He further notes that where such interference occurs, the interference is, by virtue of Article VIII of the *Outer Space Treaty* vesting jurisdiction over space objects in the state of registry, analogous to interference with a vessel on the high seas. As states may use force in self defence to respond to interference with vessels on the high seas, the author ultimately concludes that conventional force may be used in self defence to respond to a cyber attack on a space object. Any such response would of course have to satisfy the *jus ad bellum* and the *jus in bello* principles of necessity and proportionality. If the use of force in self defence is a legally available option in the event of a cyber attack, then it certainly is available to respond to a conventional attack on space based assets. See also A.J. Butler, "Peaceful Use and Self Defense in Outer Space" (1982) 25th Colloquium on the Law of Outer Space, 77 at 79, where the author discusses actual state practice and concludes "The utilization of space for self-defensive purposes has taken place and with it the interpretation of peaceful purposes has become a *fait accompli*."

> "Purposeful interference with U.S. space systems will be viewed as an infringement on our sovereign rights. The U.S. may take all appropriate self-defense measures, including, if directed by the National Command Authorities (NCA), the use of force, to respond to such an infringement on U.S. rights."[330]

And, in a statement in relation to a proposal to prevent the deployment of weapons in outer space, the Russian Ambassador to the Conference on Disarmament, made the following statement:

> "In [proposing additional international legal protection be provided to outer space objects], we are not at all seeking to detract from the significance of Article 51 of the UN Charter concerning the right to self-defense. Application of this Article as practice shows is quite compatible with the processes of arms control and disarmament."[331]

3.2.3 Conclusions on the Use of Force in Space

The failure to define the concept of "peaceful purposes," as used in both the Outer Space Treaty[332] and the Moon Treaty[333] has, as discussed in Chapter 2,[334] led to a lengthy and ongoing debate over the question of military uses of space. This debate has included the question of whether or not the Outer Space Treaty prohibits the use force in accordance with international

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[330] "Space Policy", Department of Defence Directive 3100.10 July 9, 1999 para 4.2.1. Also see the "The Space Commission Report" *supra* note 12 at 36, where the report states "A number of existing principles of international law apply to space activity. Chief among these are the definition of ...the right of self-defense...."

[331] Statement by Ambassador Leonid A. Skotnikov to the Conference on Disarmament, June 28, 2002, Online - Ministry of Foreign Affairs of the Russian Federation, <http://www.ln.mid.ru/Bl.nsf/arh/FDC3CF91FADC6EC443256BE600374C1F> See also Malcolm Russell, "Soviet Legal Views on Military Space Activities" W.J. Durch, ed., *National Interests and Military Use of Space supra* note 31, 209, where the author states "East and West both share the view that states have the same right to exercise self-defense in space that they do on earth."

[332] *Outer Space Treaty, supra* note 16.

[333] *Moon Treaty supra* note 17.

[334] See *supra,* section 2.3 Peaceful Purposes.

law. Despite the ordinary dictionary meaning of the term "peaceful", a contextual interpretation of "peaceful purposes," and a review of state practice, leads one to conclude that the better interpretation of "peaceful purposes" as used in the Outer Space Treaty means non-aggressive[335] uses of space as opposed to non-military uses.

If one accepts that the term "peaceful purposes" includes non-aggressive" military uses of space then, the next question that must be addressed is weather or not non-aggressive uses would exclude all uses of force in outer space. It is submitted that despite the persuasive arguments that have been put forward in the legal literature to the effect that the use of force in space is prohibited, the better view is that the legal framework of outer space permits the use of force in those limited circumstances permitted by international law. The following factors have been considered in arriving at this conclusion:

(a) international law, including the UN Charter is a part of international space law;

(b) the UN Charter, while prohibiting the use of force generally, does authorize its use in limited circumstances; self-defence and, when

[335] Elizabeth Waldrop, "Weaponization of Outer Space: U.S. National Policy" *supra* note 84 at 340 notes that "One US official has expressed the view that 'non-aggressive' is itself too restrictive a description, that '[t]here are times when 'aggression' is permissible (e.g., for the common interest, peace-keeping or enforcement, or individual or collective self-defense)." It is submitted that this view is erroneous, while the first use of armed force in a situation is *prima facie* aggression, as defined in the *Definition of Aggression*, GA Res. 3314 *supra* note 276, Article 2, the article states that to amount to aggression the use of force must (1) be in contravention of the UN Charter, and (2) its use cannot be justified by other relevant circumstances. As such any use of force in compliance with international law is not aggression. To extend the interpretation of "peaceful purposes" to include an aggressive use of force cannot be supported, and would run contrary to one of the fundamental objectives of the UN, as expressed in the UN Charter, the suppression of aggression.

authorized, for the purposes of maintaining international peace and security;

(c) while states might well be able to surrender their inherent right to use force in self defence, clear and unequivocal language evidencing such an intent would be required;

(d) the Outer Space Treaty does not include a clear, unequivocal statement prohibiting the use of force in space;

(e) the lawful use of force in outer space does not necessarily undermine the underlying principles of the Outer Space Treaty, as contained in the Preamble, and Articles I and II of the Treaty; in particular the principles of "freedom of use and access", "non-appropriation", and "benefit and interests of all"; and

(f) state practice suggests that states, particularly the two historical space powers, have publicly reserved the right to use force in self defence in the outer space environment.

In concluding that international space law permits the use of force in self-defence, it is important to appreciate, as noted by Dinstein, that the right to use force in self-defence does not equate to an obligation to do so.[336] As will be discussed in Chapter Four, both the deployment of weapons and ultimately resort to the use of force in space are not necessarily inevitable. Other alternatives might well serve the interests of both national and global security.

[336] Dinstein, Y *War, Aggression and Self Defence*, *supra* note 264 at 179.

3.3 Arms Control in Space

The assertion that the use of force, in accordance with international law, is legally permissible in the outer space environment does not mean that all military activities are permitted in space. The Outer Space Treaty[337] is, in part, an arms control agreement,[338] limiting both military activities and prohibiting specific types of weapons in outer space.[339] Other international treaties also impose limitations on the basing and use of weapons systems in space.[340] The effect of the legal obligations that arise from these different sources of international law is the creation of a number of different legal regimes in the outer space environment. Each one of these regimes imposes different obligations on any states that might pursue the deployment of weapons, or consider the potential use of force, in outer space.

The Limited Test Ban Treaty[341] prohibits the carrying out of any nuclear explosions in outer space. For the purposes of the test ban prohibition, outer space is viewed as a homogenous environment, the ban applying to earth orbit, celestial bodies and outer space in general.[342] The Outer Space Treaty,

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[337] *The Outer Space Treaty supra* note 16, Article IV

[338] United States President Johnson described the *Outer Space Treaty* as "the most important arms control development since the limited test ban treaty of 1963." See "Weapons of Mass Destruction (WMD) Release of Foreign Relations of the United States, 1964-1968, Volume XI, Arms Control and Disarmament. GlobalSecurity.Org, Online: <http://www.globalsecurity.org/wmd/library/news/usa/1997/bmd970414d.htm>

[339] Canada proposed that the Conference on Disarmament adopt the following definition of space based weapons systems in 1999: "Any device or component of a system designed to inflict physical harm through deposition of mass and/or energy on any other object." This definition focuses on the actual destructive device, with the aim of preventing permanent physical harm being done by space-based weapons. In turn Canada is of the view that a weapon is space based if "it orbits the earth at least once, or has or will acquire a stable station at some point beyond earth orbit." See "Not Arms, Canadarms" Text on PAROS for Delivery by Ambassador Westdal at the "Disarmament Week" Seminar New York, 11 October 2001, Department of Foreign Affairs and International Trade, Online: <http://www.dfait-maeci.gc.ca/arms/outer6-en.asp>

[340] See *supra,* Chapter 2, Part 2.2.3 Other International Instruments.

[341] *Limited Test Ban Treaty, supra* note 184

[342] *Ibid,* Article I

moves away from the homogenous treatment of outer space, instead making reference to different areas of activity in outer space. Specifically, Article IV of the Outer Space Treaty makes reference to "orbit around the earth", "celestial bodies", "the moon" and "outer space". While Article IV imposes a complete ban on the basing of nuclear or other weapons of mass destruction[343] anywhere outside the earth's atmosphere, this is accomplished by reference to each of the identified areas of activity, rather than by way of a generic reference to outer space, as was done in the Limited Test Ban Treaty.[344]

The following table provides a summary of the legal restrictions placed on the military uses of space and the treaty law source of the restriction. The limitations on military uses contained in the Moon Treaty have been included in the interests of completeness, however, it is important to recognize that very few states, and none of the major space powers, have signed or ratified the Moon Treaty.[345]

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[343] The Outer Space Treaty does not provide a definition of "weapons of mass destruction," however, it is generally accepted that the term includes nuclear, radiological, bacteriological, and chemical weapons. Ivan Vlasic "The Legal Aspects of Peaceful and Non-Peaceful Uses of Outer Space" ed. Bhupendra Jasani, *supra* note 78 at 42, where the author notes that future weapons capable of large scale destruction are also captured by the term. The Encyclopedia Britannica defines weapons of mass destruction as follows: "During the Cold War, WMD was narrowly defined to include only nuclear weapons because their use threatened the entire planet. By the end of the 1990–91 Gulf War, WMD had been used in United Nations Security Council Resolution 687—which imposed on Iraq strict rules for disarmament—to describe nuclear, biological, and chemical weapons. Since that time others have tried to alter the definition to include any weapon that disperses radioactivity or causes mass panic." Defining Weapons of Mass Destruction." Britannica Book of the Year, 2004. Encyclopædia Britannica Online. Online: <http://www.search.eb.com/eb/article-9396551>.

[344] As discussed in Chapter 2, there is some debate as to whether or not the *Outer Space Treaty* prohibition against the installation of nuclear and other weapons of mass destruction extends to the moon, due to the failure to expressly refer to the moon in paragraph 1 of article 4. The conclusion reached in Chapter 2 was that the better view was to conclude that the prohibition did in fact extend to the moon as a celestial body. See section 2.2.1 Outer Space Treaty.

[345] *The Moon Treaty supra,* note 17. Also see *supra,* note 168.

Restrictions on the Military Uses of Space		
Area of Activity	**Nature of Prohibition**	**Legal Authority**
Earth Orbit	• Nuclear explosions are prohibited	• Limited Test Ban Treaty, Article I paragraph 1(a)
	• Nuclear weapons and other weapons of mass destruction are prohibited from completing a full orbit of the earth[346]	• Outer Space Treaty Article IV paragraph 1
	• Hostile modification of the outer space environment is prohibited	• ENMOD Convention, Articles 1 and II
	• Interference with National Technical Means of Verification is prohibited	• CFE Treaty Article XV
	• Any use or threat of use of force, except in accordance with International Law, including the Charter of the United Nations is prohibited.	• Outer Space Treaty Article III; United Nations Charter Article 2 paragraph 4, Article 51 and Chapter VII
The Moon	• Shall be used exclusively for peaceful purposes	• Outer Space Treaty Article IV paragraph 2; the Moon Treaty Article 3 Paragraph 1
	• The establishment of military bases, installations and fortifications is prohibited	• Outer Space Treaty Article IV paragraph 2; the Moon Treaty Article 3 Paragraph 4
	• The testing of any type of weapons is prohibited	• Outer Space Treaty Article IV paragraph 2; the Moon Treaty Article 3 Paragraph 4
	• The conduct of military manoeuvres is prohibited	• Outer Space Treaty Article IV paragraph 2; the Moon Treaty Article 3 Paragraph 4

[346] It is generally accepted that to enter into orbit around the earth, an object must complete at least one full revolution. Canada's definition of a space-based weapon reflects this, the definition providing that a weapon is space based if "it orbits the earth at least once, or has or will acquire a stable station at some point beyond earth orbit." See "Not Arms, Canadarms" *supra*, note 339.

Restrictions on the Military Uses of Space		
Area of Activity	**Nature of Prohibition**	**Legal Authority**
	• Nuclear explosions are prohibited	• Limited Test Ban Treaty, Article I paragraph 1(a); Moon Treaty, Article 3 paragraph 3
	• The installation of Nuclear weapons and other weapons of mass destruction is prohibited	• Outer Space Treaty Article IV, paragraph 1; Moon Treaty Article 3 paragraph 3
	• Nuclear weapons and other weapons of mass destruction shall not be placed in orbit around or on a trajectory to or around the moon	• Moon Treaty Article 3 paragraph 3
	• Hostile modification of the outer space environment is prohibited	• ENMOD Convention, Articles 1 and II
	• Interference with NTM is prohibited	• CFE Treaty Article XV
	• Any threat or use of force or any other hostile act or threat of hostile act on the moon, or from the moon, in relation to the earth, the moon, spacecraft, the personnel of spacecraft or man-made space objects is prohibited	• Outer Space Treaty Article III; Moon Treaty Article 3 paragraph 2; the United Nations Charter Article 2 paragraph 4, Article 51 and Chapter VII
Celestial Bodies	• Shall be used exclusively for peaceful purposes	• Outer Space Treaty Article IV paragraph 2; the Moon Treaty Article 3 Paragraph 1[347]
	• The establishment of military bases, installations and fortifications is prohibited	• Outer Space Treaty Article IV paragraph 2; the Moon Treaty Article 3 Paragraph 4
	• The testing of any type of weapons is prohibited	• Outer Space Treaty Article IV paragraph 2; the Moon Treaty Article 3 Paragraph

[347] Article 1 of the Moon Treaty makes the treaty applicable to all celestial bodies in the solar system other than the earth except where specific legal norms enter into force with respect to any celestial body.

Restrictions on the Military Uses of Space		
Area of Activity	**Nature of Prohibition**	**Legal Authority**
		4
	• The conduct of military manoeuvres is prohibited	• Outer Space Treaty Article IV paragraph 2; the Moon Treaty Article 3 Paragraph 4
	• Nuclear explosions are prohibited	• Limited Test Ban Treaty, Article I paragraph 1(a); Moon Treaty, Article 3 paragraph 3
	• The installation of Nuclear weapons and other weapons of mass destruction is prohibited	• Outer Space Treaty Article IV, paragraph 1; Moon Treaty Article 3 paragraph 3
	• Nuclear weapons and other weapons of mass destruction shall not be placed in orbit around or on a trajectory to or around a celestial body	• Moon Treaty Article 3 paragraph 3
	• Hostile modification of the outer space environment is prohibited	• ENMOD Convention, Articles 1 and II
	• Interference with NTM is prohibited	• CFE Treaty Article XV
	• Any threat or use of force or any other hostile act or threat of hostile act on a celestial body, or from a celestial body, in relation to the earth, the moon, spacecraft, the personnel of spacecraft or man-made space objects is prohibited	• Outer Space Treaty Article III; Moon Treaty Article 3 paragraph 2; the UN Charter Article 2 paragraph 4, Article 51 and Chapter VII
Outer Space	• Nuclear explosions are prohibited	• Limited Test Ban Treaty, Article I paragraph 1(a)
	• Nuclear weapons and other weapons of mass destruction are prohibited	• Outer Space Treaty Article IV, paragraph 1
	• Hostile modification of the outer space environment is prohibited	• ENMOD Convention, Articles 1 and II

Restrictions on the Military Uses of Space		
Area of Activity	**Nature of Prohibition**	**Legal Authority**
	• Interference with NTM is prohibited • Any use of force except in Accordance with international law, including the Charter of the United Nations is prohibited.	• CFE Treaty Article XV • Outer Space Treaty Article III; United Nations Charter Article 2 paragraph 4, Article 51 and Chapter VII

3.3.1 Treaty Suspension in the Event of Armed Conflict

Treaty restrictions on military activities in outer space are applicable during times of "peace" but what are the obligations of State Parties with respect to these restrictions in the event of an armed conflict? Delbrück notes that the effect of armed conflict on treaty relations is not expressly provided for in international law.[348] Similarly, Brownlie states that the law on the subject is not clear.[349] However, Brownlie further notes that, in state practice, many types of treaties are suspended in time of war.[350] Professor Green states, "it is

[348] J. Delbrück, "War, Effect on Treaties" Encyclopedia of Public International Law Vol IV (Amsterdam: North Holland Publishing Company, 1992) at 310.
[349] Brownlie, *Principles of Public International Law, supra* note 91 at 592. Also see Ian Brownlie, *International Law and the Use of Force by States, supra* note 245 at 26, where the author notes that the practice of states since the early nineteenth century led to the development of the state of war doctrine. The doctrine essentially provides that "war" is a legal status that is subjectively determined by states. Where a state of war was declared, he notes that it "... involved a termination of commercial intercourse between the contending states and the invalidation or suspension of treaties."
[350] *Ibid* Brownlie, *International Law and the Use of Force by States* at 26.

clear that Treaties of a political or trading character between belligerents will cease to operate, at least for the duration of the hostilities"[351]

The Vienna Convention on the Law of Treaties addresses the impact of hostilities on treaty obligations, but only to the extent of stating that the "Convention shall not prejudge any question that may arise in regard to a treaty ... from the outbreak of hostilities."[352] Finally, the Institute of International Law, in a resolution adopted in 1985, notes that a state exercising its rights of individual or collective self-defence in accordance with the Charter of the United Nations is entitled to suspend, in whole or in part, the operation of a treaty incompatible with the exercise of that right.[353]

It is recognized then that, as a matter of principle, international law contemplates the suspension of certain treaty obligations in the event of armed conflict. For example, the CFE Treaty[354] obligates parties not to interfere with the NTMs of other state parties. In an armed conflict, the treaty obligation, if respected, would allow belligerents an unimpeded ability to observe and monitor the disposition of the other's military forces.[355] The non-interference principle in this circumstance would be inconsistent with a state of hostilities and therefore may be suspended or terminated as between the belligerents. Treaties governing the actual conduct of hostilities[356] or

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[351] L.C. Green, *The Contemporary Law of Armed Conflict*, *supra* note 164 at 75. He further states that " ... If the belligerents are parties to a multi-lateral treaty, the outbreak of hostilities does not affect the continued subsistence as among the non-belligerents, nor does it affect its continuance as between each belligerent and such third states, although it may be possible for any party to argue that such circumstances have so changed as a result of the outbreak of hostilities that the treaty must cease to apply by virtue of the doctrine *rebus sic stantibus*."
[352] *Vienna Convention on the Law of Treaties*, *supra*, note 96, Article 73.
[353] "The Effects of Armed Conflict on Treaties", Articles 7 and 8, Online - Resolutions Adopted between 1983 and 1991, Institut de Droit International, <http://www.idi-iil.org/idiE/navig_chon1983.html>
[354] *CFE Treaty, supra* note 198.
[355] *Ibid,* Article XV.
[356] See Adam Roberts and Richard Guelff ed., *Documents on the Laws of War*, *supra* note 239 for an overview of the conventional law governing the conduct of hostilities.

otherwise intended to operate in periods of armed conflict are not affected by the outbreak of hostilities. The ENMOD Convention, for example, is expressly intended to apply in the event of armed conflict and, therefore, a state's obligations under the ENMOD Convention would continue during a period of armed conflict.[357]

While certain obligations will clearly be subject to suspension or termination during periods of armed conflict, it is submitted that much of the uncertainty in this area of international law flows from the fact that the application of treaty provisions must be determined on a case-by-case basis, after having considered all of the circumstances surrounding the state of hostilities.[358] This contextual approach allows flexibility in the law, but it makes it difficult to determine whether or not obligations, such as those contained in the Outer Space Treaty, would in fact be suspended during a period of conflict. Presumably, if the circumstances of an armed conflict involved an aggressor state using celestial bodies in furtherance of the aggressive use of force, states lawfully responding to this use of force would be in a position to consider some or all of the restrictions on the military uses of space incompatible with the exercise of the right to respond to the aggression and, therefore, they would be entitled to suspend application of these provisions of the Treaty. This would then allow activities, such as the use of force, or the establishment of military bases, on celestial bodies, for the duration of the

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[357] *ENMOD Convention*, *supra* note 185, where the preamble states "*Desiring* to prohibit effectively military or any other hostile use of environmental modification techniques in order to eliminate the dangers to mankind from such use..." Similar language is also used in Article I.

[358] See for example the 1985 Resolution of the Institute of International Law, "The Effects of Armed Conflict on Treaties", *supra* note 353, which provides at Article 2 "The outbreak of an armed conflict does not *ipso facto* terminate or suspend the operation of treaties in force between the parties to the armed conflict." This coupled with Articles 7 and 8 providing for the termination or suspension of incompatible treaty obligations, suggests a case by case analysis is required.

conflict. On the other hand, in a regional conflict where one of the opposing belligerents lacks the technology and/or resources to rely on space, or threaten space based assets, it would be much more difficult to argue that some or all of the restrictions contained in the Outer Space Treaty would be incompatible with the state of armed conflict and therefore suspended.

Chapter 4 The Future of Space as a Theatre of Conflict

State practice has not supported the view that military uses of space are inconsistent with the Outer Space Treaty. In fact, dependence on military, and other uses of space, have developed to the point where that "dependence can be viewed by adversaries as a potential vulnerability."[359] American policy currently addresses this vulnerability by providing that "purposeful interference with space systems shall be viewed as an infringement on sovereign rights."[360]

Does strategic dependence on space, and the conclusion that force may be lawfully used in outer space, inevitably lead to space based weapons and armed conflict in space? Some believe the answer to this question is yes.[361] Others, however, argue that there are alternatives to space weaponization and that every effort needs to be made to avoid weapons and conflict in space.

The latter view is widely held by members of the international community, as reflected in the most recent UN General Assembly resolution calling for the prevention of an arms race in outer space.[362] The 2004

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[359] "Joint Doctrine For Space Operations," *supra* note 12 at I-1.

[360] "Fact Sheet National Space Policy," The White House National Science and Technology Council, 1996, Online: <http://www.ostp.gov/NSTC/html/fs/fs-5.html> where it is stated in the introduction at paragraph 3 that "The United States considers the space systems of any nation to be national property with the right of passage through and operations in space without interference. Purposeful interference with space systems shall be viewed as an infringement on sovereign rights."

[361] See for example William B. Scott, "USSC Prepares for Future Combat Missions in Space", *Aviation Week & Space Technology*, (August 5, 1996) where the then commander of U.S. Space Command, Gen. Joseph W. Ashy, is quoted as saying ``IT'S POLITICALLY SENSITIVE, but it's going to happen. Some people don't want to hear this, and it sure isn't in vogue . . . but--absolutely--we're going to fight in space. We're going to fight from space and we're going to fight into space when [orbital assets] become so precious that it's in our national interest".

[362] *Prevention of an Arms Race in Outer Space*, *supra* note 111.

Resolution, 59/65, was adopted by 178 votes to none, with 4 abstentions.[363] The Resolution recognizes that the current legal regime governing space does not prohibit the placing of weapons in space and therefore encourages member states to "contribute actively to the peaceful uses of space" and to seek an international consensus that would avoid an arms race in space.[364]

The views of the international community, as reflected in the General Assembly resolution, while certainly not binding on individual states are, it is submitted, significant, particularly in light of Article IX of the Outer Space Treaty. Article IX requires that states pursuing activities in space that would potentially harmfully interfere with the use of space by other states, undertake consultations prior to pursuing the activity in question.[365] Any possible use of force in space clearly carries with it the potential to harmfully interfere with the activities of other state parties, arguably triggering the Article IX obligation to consult prior to the deployment of any such system.[366]

While the obligation to consult would not, nor should not, prevent the implementation of a decision to deploy weapons in space, any meaningful consultation would require those states pursuing the option of space based weapons to demonstrate the benefits of such a decision. Presumably, the deployment of space weapons could be justified if it were demonstrated that

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[363] General Assembly A/59/PV.66 3 December 2004 at 7. Haiti, Israel, Palau and the United States of America were the abstaining states.
[364] *Prevention of an Arms Race in Outer Space, supra* note 111 at paragraphs 2 and 4.
[365] *Outer Space Treaty, supra* note 16 Article IX, which provides in part that "If a State Party to the Treaty has reason to believe that an activity or experiment planned by it or its nationals in outer space, including the moon and other celestial bodies, would cause potentially harmful interference with activities of other States Parties in the peaceful exploration and use of outer space, including the moon and other celestial bodies, it shall undertake appropriate international consultations before proceeding with any such activity or experiment."
[366] See for example Salin, Patrick A., "Space Law, "The U.S. National Missile Defense Initiative and the Common Concern for Global Security" (2002) XXVII Ann. Air & Sp. L. 535 at 538, where, in discussing the Article IX requirement to consult, the author states "In our opinion, consultations should be started before any bellicose action is performed, since the essence of the treaty is that war actions should be avoided."

space weapons would positively contribute to an individual state's national security interests and, perhaps even more importantly in this era of globalization, broader global security interests. [367] Clearly the analysis supporting weapons in space would have to go well beyond the legal considerations addressed in this paper to include policy, operational and political perspectives.[368]

The principle of "abuse of rights",[369] which has been recognized in international law, might also provide a basis for objecting to the placement of weapons, and/or the use of force, in space. Abuse of rights, in the international context, has been described as follows:

> "In international law, abuse of rights refers to a State exercising a right either in a way which impedes the enjoyment by other States of their own rights or for an

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[367] See "Fact Sheet National Space Policy", *supra* note 360, introduction at para 2, where the goals of the U.S. space program are expressed as including to "Strengthen and maintain the national security of the United States."

[368] Salin, Patrick A., "Space Law, "The U.S. National Missile Defense Initiative and the Common Concern for Global Security" *supra* note 366 at 537, where Stalin states "Today we are no longer dealing with strictly legal space issues, but with space policy issues highlighted by the present legal architecture framing the outer space environment."

[369] The principle of "abuse of rights" has been recognized in international law and some might argue its application in the event of the deployment or use of space-based weapons, on the basis that the right to place weapons in space is restricted by the rights of other States to pursue peaceful uses and exploration of space. In other words placing weapons in space would unreasonably interfere with the rights of other states. The exact scope of the principle of "abuse of rights" is unclear in international law. It has been suggested that for the principle to apply, it must be demonstrated that the legal right was exercised for the sole purpose of causing damage to another without any advantage being sought by the State exercising the right, or arbitrarily and without good reason. In the context of space weapons and use of force in space, the justification would be enhanced national security or the use of force in accordance with international law (self defence or pursuant to Security Council authorization). Both justifications appear to provide more than sufficient indications that a State's decision to either deploy space weapons, or use them, was neither arbitrary nor done solely to cause damage to others. However, if one were to adopt a broader interpretation of the principle, an argument could certainly be advanced. See Brownlie, *Principles of Public International Law*, *supra* note 91 at 429 where the author briefly discusses the principle of abuse of rights and notes that "it is not unreasonable to regard the principle ... as a general principle of law," one of the sources of law identified in Article 38 of the Statute of the International Court of Justice. Also see Michael Byers "Abuse of Rights: An Old Principle, A New Age" (2002) 47 McGill L.J. 389 for a detailed discussion of the principle and its application in international law.

> end different from that for which the right was created, to the injury of another State..."[370]

In the framework of international space law it might well be argued that weapons in space would impede the exploration and use of outer space in the interests and for the benefit of all, as provided for in the Outer Space Treaty.[371] Application of the abuse of rights principle in this context would, arguably, prevent a state from deploying space based weapons, even if otherwise lawful, because of the potentially negative impact the deployment of weapons would have on the rights of other states. This argument is similar to that put forward by Chandrasekharan,[372] when he argues that the *lex specialis* of outer space prevents the exercise of the right of self defence in outer space.[373] As such, the abuse of rights argument is premised on the notion that space weapons would, absent any further consideration of the circumstances, violate the underlying purposes of the Outer Space Treaty.[374] The potential argument that flows from the abuse of rights principle reinforces the importance of a broad multi-disciplined analysis of the benefits and risks associated with any decision on the deployment of weapons in space.

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[370] A. Kiss, "Abuse of Rights" in R. Bernhardt, ed., Encyclopedia of Public International Law, vol. 1 (Amsterdam: North-Holland, 1992) at 4, cited by Michael Byers "Abuse of Rights: An Old Principle, A New Age" *ibid* at 391.
[371] *Outer Space Treaty*, *supra* note 16 Article 1.
[372] M Chandrasekharan, "The Space Treaty" *supra* note 297.
[373] See the discussion in section 3.2.1 The Argument Against the Use of Force in Space
[374] *Outer Space Treaty*, *supra* note 16.

4.1 Space – The Ultimate High Ground

Space is viewed as the "ultimate high ground" by those who are convinced that weapons in space will enhance national security.[375] Control of space, it is argued, will provide an unsurpassed military advantage over any potential adversary.[376] However, others note that although space provides an unmatched vantage point from which to observe and even direct activity on the surface of the earth, the advantages of this high ground are severely limited from a military perspective:

> "On earth, high ground has physical resources near at hand for shielding and hiding behind. In space, the "high ground" has nothing: it's a vacuum and there is nothing there that you don't bring with you. On earth, high ground is often a peak with a castle on it like the Krak des Chevaliers, a choke point, a symbol of power. In the "high ground" of space, you're a thin-skinned sitting duck with a bull's-eye painted on your side. Anybody has a chance to shoot at you whenever they feel like it. High ground on earth provides you with a view of everything below you, while the people down below can't see you, because you're up over the edge of the fortification. In space, everybody can see you and people on the ground can hide from you, so all those advantages are gone. On earth, from high ground you can strike anywhere around you while those below are limited in reaching you. In space, the attacks that you might make, the trajectories that your vehicles might follow, follow paths that are predictable in advance, predictable in both space and time. Ground attacks, meanwhile, on a point in space can be almost random; they are highly variable in time and space and are unpredictable. On earth, on the high ground, you have weapons that are more effective when you aim downward, but the "high ground" in space is the easier target, being unprotected.

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[375] "Testimony of U.S. Secretary of Defense Donald H. Rumsfeld Prepared for the House Armed Services Committee 2003 Defense Budget Request," House Armed Services Committee February 6, 2002, Online: <http://www.house.gov/hasc/openingstatementsandpressreleases/107thcongress/02-02-05rumsfeld.html>. Referred to by Adolfo J. Fernandez, "Military Role in Space Control: A Primer" CRS Report for Congress September 23 2004, 1.

[376] *Ibid,* where Secretary of Defence Rumsfeld states "From the dawn of time, a key to victory on the battlefield has been to control the high ground. Space is the ultimate "high ground"."

> Attacking uphill involves difficulty and delay on the ground but in space, uphill and down hill attacks take about the same amount of time and your "high ground" is very much harder to resupply and rearm. Lastly, on earth, high ground allows a permanent control over some strategic road or territory, a choke point that interdicts all hostile traffic around it. In space, the so-called high ground is a shifting Maginot line that is easily avoided, out waited and circumvented."[377]

The high ground of space, it is argued, is not nearly as strategically advantageous from a use of force perspective as some might think. It is true that aircraft are also required to operate in an environment where natural protection is minimal, however, aircraft possess inherent advantages that compensates for this.[378] Aircraft movements are unpredictable and, as a result, so are the times and places where an aircraft might be used for the application of force. In an operational theatre, ingress and egress routes for aircraft can be quickly adjusted in response to developing threats. In high threat environments, commanders can choose not to employ their air resources or, alternatively, mix and match aircraft types to ensure that a grouping of aircraft includes the specialized capabilities necessary to respond to a variety of ground to air, and air-to-air threats. Space based systems lack this flexibility. Orbits, once established, can be easily observed and predicted.[379] This limits the element of surprise and allows an adversary to plan to disable or destroy space based systems using a wide variety of means,

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[377] James Oberg,Toward a Theory of Space Power (Washington, D.C.: George Marshall Institute, Washington Roundtable on Science and Public Policy, 20 May 2003), p. 2, quoted by David C.Hardesty, "Space-Based Weapons: Long-Term Strategic Implications and Alternatives" 3 Naval War College Review, Spring 2005, Vol. 58, No. 2, 45 at 46.

[378] David C.Hardesty, "Space-Based Weapons: Long-Term Strategic Implications and Alternatives" 3 Naval War College Review, *ibid* at 47

[379] *Ibid* at 47, where the author notes "Spacecraft, on the other hand, are inherently predictable, and combinations of satellites are "new" to the enemy only on the first orbit, after which they can be planned against and lose the initiative. Again, few similarities seem to exist between air and space vulnerabilities."

ranging from an indiscriminate nuclear explosion in orbit, to targeted attacks using kinetic ASAT weapons, directed energy weapons, or even the disbursement of debris in orbit. All of these options can be highly effective against delicate and unprotected, or lightly protected, satellite systems.[380]

4.2 Enhanced Security

Those who have considered the pros and cons of space based weapons from the political and policy perspectives do not universally accept that placing weapons in space will positively contribute to the long term national security interests of states pursuing this option.[381] While space based weapons systems might well be capable of providing a significant advantage to those states controlling them, their vulnerability suggests that if they are not employed early in a conflict situation, perhaps even pre-emptively, the risk of loss would be high.[382] The potential for early use to ensure survivability is, it is argued, at odds with the objective of enhanced national security and global stability. This question of survivability also introduces the difficulties associated with the remoteness of space, and the harshness of the environment. It is not easy to determine quickly, and with a high degree of

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[380] See the "Space Commission Report" *supra* note 12, at 17 where it is stated "Space systems can be vulnerable to a range of attacks. These include disruption activities that temporarily deny access to space-derived products; activities that completely destroy a satellite system—the ground stations, launch systems or satellites on orbit; and those with the potential to render space useless for human purposes over an extended period of time." See also "Counterspace Operations" Air Force Doctrine Document 2-2.1, 2 August 2004 at 4, where the following statement is made with respect to the threats posed to space based assets, "Adversaries can conduct attacks against our space capabilities using various methods both symmetric and asymmetric."

[381] See for example *ibid* at 45 and Theresa Hitchens, "Weapons in Space: Silver Bullet or Russian Roulette? The Policy Implications of U.S. Pursuit of Space-Based Weapons", *supra* note 87 at 12

[382] Jeffrey Lewis, "What if Space Were Weaponized? Possible Consequences for Crisis Scenarios" *supra* note 6 at 17, where a scenario is developed demonstrating how the vulnerabilities of space based systems could well provide an incentive for rapid escalation and early use of space based weapons systems.

certainty, what might be the cause of the failure of a space based system. Has a system failure been caused by natural phenomena or, alternatively, is it the result unlawful interference with a system by a potential adversary.[383] In times of heightened tension, will States controlling space based weapons be prepared to wait for a definitive answer to this question, particularly if it means risking the loss of its space based strike capabilities, or will States opt to act? Will the deployment of weapons systems into this remote and naturally hostile environment achieve the objective of enhanced national and global security or, inadvertently, undermine it.

Those questioning the security benefits of space based weapons also note that other states will not sit by and watch as one state, or a small group of states, seeks to dominate the outer space environment from a military perspective. States not involved, it is argued, would view the move towards the military uses of space for more than simply force enhancement purposes as a threat to their national security interests. It is suggested that states finding themselves in this position will respond by initiating or accelerating their own programs aimed at the development of space weapons and ground based systems capable of striking targets in space.[384] These states would, in turn, rely on the precedent set by the initial deployment of space-based weapons for defensive, and therefore peaceful purposes, to justify a decision on their part to place weapons in space. This inevitable increase in the number of space-based weapons, and states controlling them, will increase the risk of

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[383] *Ibid* at 25, where an accidental conflict scenario is developed demonstrating the potential dangers of placing vulnerable yet strategic systems in environments where information and data flows are often unable to provide a full picture of what is occurring in a timely manner.
[384] David C.Hardesty, "Space-Based Weapons: Long-Term Strategic Implications and Alternatives", *supra* note 377 at 50, and *Ibid* at 13.

accidents and provide States with further motivation to resort to an early or pre-emptive use of space weapons in times of crisis.

It is further argued that the deployment of space based systems designed to counter the ballistic missile threat will increase the risk presented by ballistic missiles, rather than reduce it. The fear is that the deployment of a ballistic missile defence system will lead to a proliferation of missiles as States dramatically increase their ICBM inventories as a means of ensuring a minimal survivability rate in a missile defence environment.[385] At the same time it is suggested that those States that rely on nuclear ballistic missile forces for deterrence will seek to retain the deterrent effect of their forces by increasing their alert postures and delegating release authorities to lower levels within the national command structure of these states. This will in turn increase the chances of an accidental nuclear exchange.[386] Missile proliferation, increased alert levels and decentralized release authorities would, it is argued, all negatively impact on global security.

Some advocate that there are no alternatives to the basing of weapons in space or, ultimately, conflict in space. In effect, space is no different from the mediums of air, land and sea. Space is merely another environment in which human activity occurs. The deployment of weapons and use of force, if required, will inevitably occur in space, as it has in all other areas of human activity.[387] Those who believe both the weaponization of space and the use of force in space are inevitable argue in turn that to not pursue the development

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[385] David C.Hardesty, "Space-Based Weapons: Long-Term Strategic Implications and Alternatives", *ibid* at 50.
[386] "What if Space Were Weaponized? Possible Consequences for Crisis Scenarios" *supra* note 6 at 21.
[387] See for example "Joint Doctrine For Space Operations," *supra* note 12 at GL-5, where "space" is defined as "A medium like the land, sea, and air within which military activities shall be conducted to achieve US national security objectives."

and deployment of space-based weapons will simply surrender the initiative in the outer space environment to a potential adversary.[388]

The inevitability argument has been subjected to a variety of criticisms. It has been noted, for example, that inevitability has not been relied upon as a rationale for not pursuing nuclear non-proliferation or restrictions on the development and stockpiling of other weapons of mass destruction.[389] It is also noted that States have avoided placing weapons in space for more than forty years, despite having the technology to do so a situation that is hard to reconcile with the notion that space weaponization is inevitable. Even if one accepts that weapons in space, and their use, is inevitable, this cannot be used, it is argued, as a justification for inaction. Inevitable events can be positive or negative. A positive inevitability needs to be pursued with the objective of hastening its arrival, whereas a negative inevitability needs to be forestalled for as long a period as possible. If space weapons, and their use, are inevitable then, it must be determined whether or not this inevitability will have the positive result of enhancing national and global security or, the negative effect of undermining it. If it is determined that the positive effects of space weapons outweigh the negative consequences then weapons in space should be pursued. However, if the negative outweighs the positive then every effort should be made to delay the inevitability just as we do with the ultimate inevitable event in life, death.[390]

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[388] Theresa Hitchens, "Weapons in Space: Silver Bullet or Russian Roulette? The Policy Implications of U.S. Pursuit of Space-Based Weapons", *supra* note 87 where the author quotes the undersecretary of the Air Force, Mr. Teets as stating on 6 March 2002 "I believe weapons will go into space. It's a question of time. And we need to be at the forefront of that."
[389] David C.Hardesty, "Space-Based Weapons: Long-Term Strategic Implications and Alternatives", *supra* note 377 at 55.
[390] *Ibid* at 55-56.

4.3 Alternatives

Those who question the benefits of space weapons do acknowledge that there is a legitimate need to ensure the security in space.[391] While the deployment of space weapons is one option in the pursuit of space security it is not the only option. A range of alternatives exist that if employed individually, or collectively, might well prove to be more effective in achieving the ultimate goal of enhanced security in the space environment.

The vulnerability of the communications, navigation, intelligence, surveillance and reconnaissance systems currently deployed in space could be greatly reduced through the development of a system that fully integrates space based capabilities with both manned and unmanned airborne assets. Long loitering UAV platforms and manned aircraft[392] both have the potential of delivering capabilities that are similar to those provided by space-based assets in a defined geographical area, with the benefit of greater flexibility. Integration of space based and airborne systems would allow manned and unmanned airborne systems to enhance or, if necessary, replace satellite services in a specific geographic area. This integrated system would provide redundancy, increasing the survivability of the system.

Redundancy might also be achieved through the deployment of in orbit spares. These spare satellites would be available to replace satellites in a particular constellation that might be damaged or disabled in a conflict situation. Similarly, the development of launch on demand technology would

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[391] Theresa Hitchens, "Weapons in Space: Silver Bullet or Russian Roulette? The Policy Implications of U.S. Pursuit of Space-Based Weapons", *supra* note 87, where the author recognizes "the very real concern about vulnerability of space assets...".
[392] David C.Hardesty, "Space-Based Weapons: Long-Term Strategic Implications and Alternatives", *supra* note 377 at 59.

allow for the immediate replacement of disabled satellites or, alternatively, the augmentation of particular satellite constellations to respond to specific needs.

These options, while not necessarily improving the survivability of individual satellites, would achieve the ultimate goal of preserving military capability. However, enhanced satellite survivability is another alternative to weapons in space.[393] The development of technologies aimed at improving the ability of satellites to survive debris strikes or targeted interference with their systems will decrease the vulnerability of key systems to both intentional interference and harmful natural phenomena. In addition to enhancing satellite survivability the development of technology to allow for on orbit repairs of damaged satellites would also greatly improve the ability of space systems to maintain a high degree of functionality even where these systems are subjected to an increased threat level.

Enhanced situational awareness within the space environment would also enhance security, making it easier to identify potential threats to space based systems. Enhanced situational awareness would not only allow for threat identification, but it would also permit the timely implementation of protective measures such as the deployment of shielding systems or the movement of satellites away from potential threats. Fuel restrictions make wide spread use of mobility as a defensive measure for satellites impractical, but the development of technology to allow for the refuelling of satellites in orbit would make rapid movement away from threats a much more realistic defensive option, particularly for high value orbital assets.

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[393] *Ibid* at 63.

Another alternative is pursuit of a comprehensive arms control agreement that would prohibit the deployment of space-based weapons. While an arms control agreement may be an attractive alternative to weapons in space, this alternative comes with a number of qualifiers. Firstly, an international agreement prohibiting the deployment of weapons in space would be of little practical value if the major space powers were not all parties to the agreement.[394] The world's pre-eminent actor in outer space, the United States does not currently see the need for a comprehensive arms control agreement addressing outer space, satisfied that the limited provisions of the Outer Space Treaty are sufficient.[395] Since 1998, the American position has contributed to a deadlock in discussions before the United Nations Conference on Disarmament on the question of weapons in space.[396]

Secondly, any comprehensive disarmament agreement addressing space would have to include a workable definition of space weapons, something that has proven elusive in the limited discussions that have taken place between members of the Conference on Disarmament.[397]

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[394] See the statement by Ambassador Eric Javits to the Conference on Disarmament, June 27, 2002, CD/PV.907 at 15, "I doubt that anyone in this room will be surprised if I reiterate now, as I did on 29 May, that the United States sees no need for new outer space arms control agreements and opposes the idea of negotiating a new outer space treaty. We believe that the existing outer space regime is sufficient, and the statement that I made at the conference explains the reasons for that belief."

[395] *Outer Space Treaty supra* note 16 Article IV.

[396] See "Space Security 2004" (Toronto: Northview Press Ltd, 2005) at 31 Spacesecurity.org, Online: <http://www.spacesecurity.org/> where it is stated "... the CD remained deadlocked in 2004..." The deadlock flows from a disagreement over how to prioritize advancement in the areas of the Fissile Material Cut-off Treaty, and the Prevention of an Arms Race in Outer Space (PAROS).

[397] See for example Report of the International Conference on "Safeguarding Space Security: Prevention of an Arms Race in Outer Space", CD 1753 8 July 2005 at 9, Presented to the Conference on Disarmament, United Nations Office at Geneva, Online: <http://www.unog.ch/80256EE600585943/(httpPages)/B8B81436293BCD6AC1256F5600559BF9?OpenDocument>, where the report states "Nevertheless, while the objective of verification is easily judged, it is practically a difficult task to define the 'object of verification', in this case to define 'space weapons' and 'threat or use of force towards space objects'." See also Christopher M. Petras "The Debate Over the Weaponization of Space – A Military-Legal Conspectus" *supra* note 133 at 200 where the author notes a two fold problem with defining

Ultimately, any decision relating to the deployment and/or use of space weapons must be based on an analysis of the long-term impact of the decision on national and global security. In the case of the United States, one author has noted that:

> "Unfortunately, the required analysis and decisions have not been made, nor are they in sight – but a national policy with regard to the space basing of weapons is needed now."[398]

The conclusion that the use of force in space is legally permissible within the current legal framework governing activities in space is not the end of the analysis when addressing questions related to the deployment and use of space weapons. Rather, it must be considered the starting point of a broad based, multi-disciplinary analysis. An analysis that considers all of the options available to address space based security concerns and the potential consequences of pursuing each of the available options.[399] While the conclusions of such an analysis might well lead to the deployment of space weapons as the means of best serving long term security interests, this conclusion is not, it is submitted, as obvious as some might suggest.

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space weapons. First is the difficulty in distinguishing between current military force enhancement uses of space (non-aggressive, non-destructive uses) and, those uses which would involve space based weapons. The second is how to address non-dedicated space weapons, weapons not designed for use in space but that can be readily converted for such use.

[398] David C.Hardesty, "Space-Based Weapons: Long-Term Strategic Implications and Alternatives", *supra* note 377 at 65.

[399] See Thresa Hitchens, "Weapons in Space: Silver Bullet or Russian Roulette? The policy Implications of U.S. Pursuit of Space-Based Weapons" *supra* note 87 at 19 where the author notes that "The short-term military advantages to the U.S. military of being first to utilize space weapons, however dramatic, must be weighed against the long-term military, political and economic costs."

CONCLUSION

The history of space exploration, development and use is, in many ways, a history of the military development of space. Scientific interests have certainly been an important aspect of space exploration, however, military interests, not science, drove the development of the technology required to open up access to space almost 50 years ago.[400] While world leaders have espoused the peaceful uses of outer space and states have avoided both the deployment and use of space weapons, members of the international community, particularly the space powers, have maintained a vigorous and growing military presence in space. Today, military users of space are not restricted to the space powers. Advances in technology and the greater availability of launch services have made space accessible to an increasing number of nations. Even states that lack the technology and resources to access space themselves are able to rely on space based technology, purchased from others, to support their military activities. The debate over the meaning of "peaceful purposes" that raged at the dawn of the space age and continues today has, regardless of the original intent of the drafters of the Outer Space Treaty, been overtaken by state practice.

Today, non-aggressive military uses of space are well established in the space arena and the primary debate over the uses of space has shifted from the issue of militarization to questions of weaponization and the use of force in space. Do non-aggressive military uses of space allow for the deployment of

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[400] Ivan Vlasic "The Legal Aspects of Peaceful and Non-Peaceful Uses of Outer Space" *supra* note 188 at 39.

defensive weapon systems in space, and, in turn, can force be lawfully used in outer space? The answer, it is submitted is yes. While the ability of states to deploy weapons and use force in space is subject to the arms control and demilitarization provisions found in the Outer Space Treaty, these limitations and restrictions do not amount to a complete prohibition on weapons in space. The legal regime governing state conduct in outer space allows for the deployment of conventional weapons systems and the use of these systems in circumstances where international law authorizes the use of force.

Despite this conclusion, militarization of outer space has not lead to weaponization or the use of force in space. To date, states have exercised restraint, restricting their military uses of space to passive activities. Whether or not this restraint will continue depends very much upon how states perceive the threat to their security and other national interests. Clearly, the current security environment, as seen from the perspective of the worlds only remaining super-power does not favour continued restraint:

> The gravest danger our Nation faces lies at the crossroads of radicalism and technology. Our enemies have openly declared that they are seeking weapons of mass destruction, and evidence indicates that they are doing so with determination. The United States will not allow these efforts to succeed. We will build defenses against ballistic missiles and other means of delivery. We will cooperate with other nations to deny, contain, and curtail our enemies' efforts to acquire dangerous technologies. And, as a matter of common sense and self-defense, America will act against such emerging threats before they are fully formed. We cannot defend America and our friends by hoping for the best. So we must be prepared to defeat our enemies' plans, using the best intelligence and proceeding with deliberation. History will judge harshly those who saw this coming danger but failed to act. In the new world we have entered,

> the only path to peace and security is the path of action.[401]

Action, in the context of outer space may well mean the deployment of space based weapons by the United States. The challenge for the international community and individual states, prior to any such decision being made, is to closely examine the question of national security in the context of space. How significant is the actual threat, how effective will defensive measures be and finally will the potential consequences of a move towards space weaponization, discussed in Chapter Four, negate the anticipated security benefits of space weaponization. In this context, the legal aspects of the use of force in space appear simple and straightforward; it is the policy aspects that present the real challenges.[402] However, the ultimate answer may well be rooted in the law, in the form of an international agreement that accomplishes what the current legal regime does not, a prohibition against all weapons in space. While an International agreement would not respond to the threat posed by non-state actors and rogue states, if an agreement were to achieve an enhanced level of global security, land and air based technologies coupled with enhanced global cooperation might well prove capable of responding to this threat.

As we ponder the future of outer space and its potential weaponization, we would do well to recall the words of Professor Cheng, written at the outset

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[401] As reflected by President Bush's comment covering the 2002 National Security Strategy of the United States *supra* note 287.

[402] See Salin, Patrick A., "Space Law, "The U.S. National Missile Defense Initiative and the Common Concern for Global Security", *supra* note 366 at 545, where the author, in opposing the American National Missile Defense program states "Without hesitation, such a program is conforming to the actual international legal environment, but is it enough? Certainly not. What should be debated is not its legal aspect... questioning should be directed towards its legitimacy in the face of humanity."

of the space age but equally applicable to the challenges the international community is facing today:

> "The recipe for successful law making, like government in general, is the art of the possible. Idealistic proposals which ignore the realities of international life can do more harm than good to an emergent branch of the law where many urgent problems require international good will and cooperation for their solution.[403]

[403] Bin Cheng, *From Air law to Space Law*, 13 CLP (1960), 228. Reproduced in Cheng, *Studies in International Space law*, *Supra* note 89 at 31.

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