

## Militarization of Space and Arms Control

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### CONTENTS

**I. Introduction**

**II. Current Arms race in Space**

**III. Current Proposal on Prevention of Arms race in Space**

1. Definition of Space Arms Control
2. Current Proposal on Prevention of Arms race in Space

**IV. Propose of Measures of Space Arms Control**

1. Basic Arms Control
2. Structural Arms Control

**V. Conclusion**

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## I . Introduction

In the sixty-year since the first launch of Sputnik 1, it has become impossible to consider economic, political, or scientific human life in the communication field without reference to outer space. As proved in the recent Iraq, Gulf, and Kosovo Wars, space capability necessary actor of modern warfare. Space power is becoming a barometer of national power. Commercial and military activities were developed by the US and former Soviet Union in the early days, but in the 21st Century many nation participate in space activities either directly or indirectly. Because of the importance of space and security interests, China, Japan, the EU, as well as US and Russia, spur military and commercial space development. space development contributes to positive human life, but there are increasing concerns that the final frontier-outer space-could become a theater of war. Space is now thoroughly integrated into terrestrial ecosystems, especially in the United States and other economically advanced societies, but to a growing degree everywhere. Indeed, satellites have been insinuated into every aspect of modern life, but sometimes with a subtlety that obscures their true impact.<sup>1)</sup> For many observers the prospect of an arms race in outer space is brought closer by the possibility of US and Russian unilateral military use of space. As a result, there is a growing groundswell of

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1) David A. Koplow, *The Fault Is Not in Our Stars: Avoiding an Arms Race in Outer Space*, volume 59 , Number 2, *Harvard International Law Journal*. 331 (2018), p.334.  
See generally Elbridge Colby, *Ctr. for a New Am. Sec., from Sanctuary to Battlefield: A Framework for U.S. Defense and Deterrence Strategy for Space* (2016) Theresa Hitchens & Joan Johnson-Freese, *Atlantic Council Strategy, Strategy Paper No. 5, Toward a New National Security Space Strategy* (2016) Joan Johnson-Freese, *Space Warfare in the 21st Century* (2017); 1 Bhavya Lal et al., *Inst. for Def. Analyses, IDA Paper P-5242, Global Trends in Space* (2015) [hereinafter IDA]; Bruce W. MacDonald et al., *Foreign Policy Inst., Crisis Stability in Space: China and Other Challenges* (2016) *Comm. on Nat'l Sec. Space Def. & Prot., Nat'l Research Council, National Security Space Defense and Protection* (2016) [hereinafter NRC Report]; *Space Security Index* (Jessica West ed., 13th ed. 2016); Jack M. Beard, *Soft Law's Failure on the Horizon: The International Code of Conduct for Outer Space Activities*, 38 *U. Pa.J. Int'l L.* 335 (2017).

public opinion aimed at preventing such an arms race developing and to guarantee the peaceful use of space. This is a vital and pressing need. Because every nation has a different posture on the grounds of national interest, or different levels of space development, the conditions required for the successful negotiation of a comprehensive treaty are not yet ripe. However, it is possible to conduct studies on the sustainable use of space, a Code of Conduct for space, and space debris, as well as practical and confidence building measures such as notification of launch. The Sputnik 1 launching in 1957 made the world recognize the necessity of international regulations on space development and activities in outer space. The United Nations established COPUOS the very next year, and adopted the mandate to examine legal issues concerning the peaceful uses of outer space. At the time, the military sector of the US. and the Soviet Union were in charge of the space development and they were not welcomed to discuss the prohibition of the military uses of outer space at the legal section in the COPUOS. Although both countries had common interests in securing the freedom of military uses in outer space. This article examines the current state of military space development in the world and discusses the international efforts to prevent military space development competition. Based on this examines, I will suggest proposal of measures of space arms control.

## II . Current Arms race in Space

Nowadays, US, Russia, China, India eager to develop military space capability. At this time, I will review every nation's space capability and trend.

A war in outer space sounds like the stuff of science fiction but it is something we need to consider. Its impact on everybody on Earth and its implications for future human space exploration would be devastating.<sup>2)</sup> In June this year, US.

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2) Global Counterspace Capabilities: An Open Source Assessment 3-17, April 2018, SWF.

Secretary of the Air Force Heather Wilson said a future war in space is likely and the US is investing heavily in maintaining its military dominance in space. She commented: We must expect that war, of any kind, will extend into space in any future conflict, and we have to change the way we think and prepare for that eventuality.

Chinese strategic community sees space as the ultimate high ground, the key to military success on the terrestrial battlefield. Washington believes that underlying the various civilian aspects of China's space program is an active military component. A 2015 report prepared by the U.S. Department of Defense suggests that China has invested in advanced space capabilities, with particular emphasis on "satellite communication (SATCOM), intelligence, surveillance, and reconnaissance (ISR), satellite navigation (SATNAV), and meteorology, as well as manned, unmanned, and interplanetary space exploration. A report prepared for the U.S.-China Economic and Security Review Commission states that the People's Liberation Army (PLA) recognizes that in a time of war it must deny enemies the use of strategic information about troop and ship movements, incoming missiles, navigation, communication, etc, along with depriving its opponents the use of C4ISR systems. The report goes on to state that "Chinese analysts assess that the employment of space-based C4ISR capabilities by potential adversaries, especially the United States, requires the PLA to develop capabilities to attack space systems. Based on this assessment, Chinese analysts surmise that the loss of critical sensor and communications capabilities could imperil the US. military's ability to achieve victory or to achieve victory with minimal casualties."<sup>3)</sup>

After the Soviet Union broke apart in 1991, funds reportedly ran thin for the Russian space program. A year later, Roscosmos was formed to coordinate space activities for Russia. The United States was concerned that the fall of the Soviet Union might cause economic havoc in that area of the world. As of early 2018, all astronauts leaving for the ISS leave from Baikonur. This situation has persisted

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3) Andrew Jones, "Chinese space program insights emerge from National People's Congress", Space News magazine, March 26, 2018.

since 2011, when NASA retired the aging space shuttle. At the time, the agency expected to restart flights on U.S. soil in 2015, when the Commercial Crew Program's spacecraft were ready. The Indian armed forces' dependence on technology has increased in the post-Cold War era. The Revolution in Military Affairs (RMA). The Indian armed forces have a mix of both conventional and emerging technologies. They appear to be opting for a hybrid RMA3 model, combining both conventional and modern technologies. In these circumstances, space becomes an extremely important segment of India's security architecture. This article attempts to understand how the Indian state views space in its overall security calculus.<sup>4)</sup> Japan launched its first military communications satellite in Jan 2017. The Japanese satellite, known as the Kirameki-2, launched from Tanegashima Space Center in Kagoshima Prefecture. North Korea tested 24 ballistic missiles last year and is close to capable of striking Japan with a nuclear device with reliable accuracy. To counter the North Korean threat, Japan has increased trilateral information sharing on missile defense, carried out multiple exercises, issued open intercept orders, and plans on carrying out its first civilian evacuation drills preparing for a ballistic missile strike. The Japanese Aerospace Exploration Agency (JAXA) has accomplished some impressive things over the years. Between 2003 (when it was formed) and 2016, the agency has launched multiple satellites - ranging from x-ray and infrared astronomy to lunar and Venus atmosphere exploration probes - and overseen Japan's participation in the International Space Station.<sup>5)</sup>

Iran views its space program as critical to its national pride and the fight against its external enemies. Iran's pursuit of space capabilities is a relatively recent development, and its efforts in space are often viewed as a thinly-veiled cover for its developing

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4) India Review, vol. 10, no. 4, October - December, 2011, pp. 379 - 393, Copyright © Taylor & Francis Group, LLC, ISSN 1473-6489 print; 1557-3036 online, DOI: 10.1080/14736489.2011.624023

Indian Armed Forces and Space Technology, AJEY LELE.

5) THE DIPLOMAT, Japan Plans First Military Communications Satellite Launch Japan anticipates the operationalization of a space-based X-band military communication satellite network. By Ankit Panda,, January 19, 2017 for The Diplomat

ballistic missile program. Iran still has a relatively weak space industrial base, especially given evidence suggesting that a portion of Iran's space technologies were adapted from Russian and North Korean counterparts. Iran has developed, tested, and proliferated a wide range of ballistic missiles, including the Shahab-3. North Korea has an active space program that is closely related to its missile program, which has made significant progress in recent years. Still, many experts doubt that the few satellites launched by North Korea perform all of the functions that the North Korean government claims. North Korea has also made significant progress in developing and testing ballistic missiles. Under the Kim Jong- Un regime, it has ramped up its missile test program from 6 ballistic missile launches in 2012 to 25 launches in 2017. Its November 2017 test of the Hwasong-15 ICBM followed a lofted trajectory to reach an apogee of 4,475 km and a range of 950 km. Based on publicly available information, however, it is not clear whether North Korea has developed the re-entry. North Korea launch cause some unease among Asian power-brokers China, Japan and India as they pour money into the last strategic frontier of outer space. Space programs in Asia have largely been driven by competition for the US\$300 billion global commercial transponders market, which is expected to double by 2030. In 2017, it managed to launch 104 satellites of varying sizes in just one operation. India and Japan are both locked in undeclared space races with China that go well beyond commercial rivalries and have muddied the debate over North Korea's shadowy aims. The Asian triumvirate of China, India and Japan contend that they are developing military applications and not weapons, though this is impossible to verify because their space programs have also become more secretive. "Militarization" refers to any systems that enhance the capability of forces in a conventional setting, such as intelligence, communications and surveillance.<sup>6)</sup> "Weaponization" is the physical deployment of weapons in outer space or in a ground mode where they can be used to attack and destroy targets in orbit. The United Nations Treaties and Principles on Outer Space prohibit the deployment

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6) See Kim, Han Taek, "Militarization and Weaponization of Outer Space in International Law", 航空宇宙政策・法學會誌第33卷第1號(2018. 06),

of weapons of mass destruction in space, but the US has blocked efforts to ban space weapons outright. In 2007, US said it would “preserve its rights, capabilities, and freedom of action in space.” Wary of the Americans gaining an unassailable technological edge, China and Russia campaigned for a time for a weaponization ban, but then China shocked the world in 2007 by using a missile to destroy an obsolete weather satellite. In most respects, the history of mankind's ascent to space is a history of the militarization of outer space. A review of this history, along with a basic familiarization of current and potential implements of space warfare, provides the requisite context from which the analysis herein can proceed to legal considerations related to the weaponization of space. Humans have demonstrated remarkable creativity and persistence in developing a plethora of space weapons. For purposes of this Article, the full array of counter-space or space-control activities and apparatus is under evaluation. The technology (as developed, tested, and deployed, or at least as conceptualized) includes kinetic-energy interceptors (developing a physical mass of some sort to be sent into space, to collide with a target or to explode nearby, shattering both vehicles); directed-energy systems (exploring the use of high energy lasers, microwave systems, or other concepts, to burn holes in targeted satellites, blind their sensors, or otherwise damage or destroy them); or cyber mechanisms (inventing capabilities to interfere with uplinks and downlinks, to disrupt the space vehicle's normal functions, or even to commandeer it).<sup>7)</sup>

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7) Space Security Index, *supra* note 1, at 99 - 104 (discussing a variety of mechanisms for attacking satellites); Martin, *supra* note 3; see Heginbotham et al., *supra* note 5, at 237 - 41 (analyzing the risks that U.S. counter-space programs could pose for China); Todd Harrison et al., Ctr. for Strategic & Int'l Studies, Implications of Ultra-Low-Cost Access to Space Air Univ., Maxwell Air Force Base, Fast Space: Leveraging Ultra Low-Cost Space Access for 21st Century Challenges 10 - 18 (2017); Stephen Shea et al., Terror on High: Deterring ASAT, *Space & Def.*, Spring 2015, at 59, 60 - 63 (discussing alternative mechanisms for attacking satellites); Mike Gruss, DoD Will Spend \$2 Billion on Space Control This Year, *Space News* (Mar. 23, 2016), <http://spacenews.com/dod-willspend-2-billion-on-space-control-this-year/>; Patricia Lewis & David Livingstone, The Cyber Threat in Outer Space, *Bull. Atomic Scientists* (Nov. 21, 2016), <https://thebulletin.org/cyber-threat-at-outer-space101> 78; Jana Robinson, Governance Challenges at the Intersection of Space and Cyber Security, *Space Rev.* (Feb. 15, 2016), <http://www.thespacereview.com/article/2923/1> (emphasizing the conjunction of space and cyber security) Christopher Stone, Rethinking

Among other things, an understanding of technical space developments provides insight into the way international legal norms have developed. Such weapons can be grouped according to a variety of criteria. They can be grouped by missions intended such as “anti-satellite” and “missile defense,” or by methods of pursuit such as “boost phase intercept” and “direct ascent.” To date, there has not been a single reported case of force used in outer space by one nation against another. Nonetheless, given the increasing global reliance on space systems and the rising proclivity to militarize space, the weaponization and evolution of space into a distinct theater of military operations is a pending phenomenon. Though technologies applicable for space combat will include a wide variety of military instrumentalities, the development of space weapons is the most obvious choice. Such weapons can be grouped according to a variety of criteria. They can be grouped by missions intended such as “anti-satellite” and “missile defense,” or by method of pursuit such as “boost phase intercept” and “direct ascent.” Depending on its characteristics, a space weapon could fit within fall under several different categories at once. China, Russia, the United States, European Union and other countries will deploy robotic servicing spacecraft to remove space debris or to refuel, repair or upgrade satellites already in orbit. These supposedly peaceful robotic spacecraft from China and Russia can be readily re-tasked in space to threaten and disable our critical satellites.<sup>8)</sup> The most probable future space weaponry can be described using this method of identification, including those representative samples discussed in the four categories below.

a) Electromagnetic and Radiation Weapons<sup>9)</sup>

b) Kinetic Energy and Hypervelocity Weapons<sup>10)</sup>

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the National Security Space Strategy: Part 3, Space Rev. (Feb. 8, 2016), <http://www.the-spacereview.com/article/2918/1>.

8) Brian Chow, “Is It Time for ‘Space Arms Control’?”, *The National Interest* (<https://nationalinterest.org>), December 9, 2018

9) essential electromagnetic and radiation weapon is the nuclear bomb.

10) Kinetic energy weapons are historically the most common forms of space weaponry. As suggested above, given the tremendous speeds at which objects travel in orbit, on the order of 4.7 miles per second in low-earth orbit, just about anything properly aimed could



- c) Laser Weapons<sup>11)</sup>
- d) Particle Beam Weapons<sup>12)</sup>

### III. Current Proposal on Prevention of Arms race in Space

As we have seen, many countries are making great efforts to use the space for military purposes. As a result, many nations simultaneously express concerns about the militarization and battlefields of the space. In addition, arms control measures of space are proposed as a countermeasure against the competition of the space armament. Next, I will examine the basic arms control theory and current international arms control strategy.

#### 1. Definition of Space Arms Control

The central idea of the concept of arms control is that it can make a useful contribution to improve the security of states by creating strategic stability and thereby avoiding war. Even relations among enemy states are not ones of purely conflict. They involve “strong elements of mutual interest in the avoidance of a war that neither side wants, in minimizing the costs and risks of the arms

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become a weapon even without the use of an explosive warhead. This is true because such an object's speed, including those of very small masses, gives it tremendous kinetic energy for impact.

- 11) “Laser” is an acronym for Light Amplification by Stimulated Emission of Radiation and is a device that produces a narrow beam of radiation by means of a physical emission. The light constituting the laser beam can be produced by a variety of chemical means. Key components of such a weapon include both the laser itself and the beam control subsystems which aim the beam.
- 12) The first proposed use of particle beam weapons for satellite defense occurred in 1965. Even more technically challenging than lasers, both particle beam and laser weapons constitute “directed energy” weapons-that is, weapons which destroy their targets by delivering energy at or near the speed of light (approximately Mach 1,000,000).

competition, and in curtailing the scope and violence of war in the event it occurs”. A special case of arms control is preventive arms control.<sup>13)</sup> A distinction can also be made between disarmament as a process (the process of eliminating weapons), and disarmament as an end state (the absence of weapons). Disarmament has also come to be associated with three things, none of which relate to the systematic and comprehensive reduction of weapons: (1) Basic Arms Control, (2) Structural Arms Control, and (3) Operational Arms Control.

General Arms Control is divided into Structural Arms Control and Operational Arms Control. Structural Arms Control limits, reduces, and abolishes the causes of war. Operational Arms Control reduces the possibility of sudden attacks and increases security.<sup>14)</sup> Basic Arms Control is Confidence Building Measures (CBMs). CBMs are relatively easy to begin, drawing upon mutual agreement with the accumulation of the actual result being very important. It is imperative to dissolve mutual mistrust in order to continue arms control.

Verification of mutual agreement is crucial for relevant arms control measures or CBMs. There is no purpose of mutual agreement in and of itself if there is no agreement, and measures of verification are useless if arms control is compromised. Nations break agreements in spite of voiced cooperation with regard to arms control. In view of these general arms control theories, the definition of arms control is to accomplish security in order to reduce or weaken a military threat by mutual consultation with a potential enemy or opposing state.<sup>15)</sup>

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13) Max M. Mutschler, Preventive Arms Control in Space: Breaking the Deadlock, Paper presented at ECPR-SGIR 7th Pan-European International Relations Conference, Stockholm 9-11 Sep. 2010. Section 7 - International Security. Panel: Arms control as a condition for or as a result of security?, Institute of Political Science, University of Tübingen, pp.2~3.

14) *ENCYCLOPÆDIA BRITANNICA*, Arms control, any international control or limitation of the development, testing, production, deployment, or use of weapons based on the premise that the continued existence of certain national military establishments is inevitable. The concept implies some form of collaboration between generally competitive or antagonistic states in areas of military policy to diminish the likelihood of war or, should war occur, to limit its destructive-ness.

15) Shin, Dong-Chun, Cho, Hong-Je, “Military Competition and Arms Control in Space”,

Arms control is meant to “include all the forms on military cooperation between potential enemies in the interest of reducing [1] the likelihood of war, [2] its scope and violence if it occurs, and [3] the political and economic costs of being prepared for it.”

These are the three benefits of arms control. It should be emphasized that arms control includes both multilateral legally-binding measures and voluntary measures. Examples of the former are treaties; examples of the latter are transparency and confidence-building measures (TCBMs) and guidelines for the long-term sustainability of outer space activities sponsored by the United Nations.<sup>16)</sup> The definition of space arms control is to achieve security in order to reduce or weaken space military threats. The definition of space arms control can be contrasted with arms control, which essentially refers to the act of controlling arms rather than eliminating them.

## 2. Current Proposal on Prevention of Arms race in Space

In the Fourth Committee of COPUOS which delivered the agenda items such as Strength of International Space Law to Prevent Militarization of Outer Space, and Respond to Other Current Challenges, United States said that space exploration thrived under the existing international framework and the Russian Federation warned of gaps in space law ratification, and risk of space becoming an arena for arms race. Before concluding their consideration of the peaceful uses of outer space, the delegations weighed the jurisdiction of the existing international space law to prevent the militarization of outer space and respond to other current challenges, such as the use of nuclear power sources in outer space and the threat of space debris.<sup>17)</sup> The position and prospects of the various nations with regard

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航空宇宙法學會誌 第26 卷 第2 號 (2011, 12), pp.218-219.

16) Brian Chow, “Is It Time for ‘Space Arms Control?’”, *The National Interest* (<https://nationalinterest.org>), December 9, 2018

17) Department of Public Information, Sixty-fifth General Assembly Fourth Committee 10th Meeting(AM) 14 October 2010 General Assembly GA/SPD/458.

to space arms control have already been reviewed. In order to prevent the space arms race, Russia and China have emphasized the need of a new international law. According to them, this law should further define the limitations within the terms of the current international law system and guarantee transparency and mutual confidence among nations. On the other hand, the United States opined that making a new treaty on space arms control in the current international law system would be unnecessary and adhered to the dominant position that non-interference should be maintained in outer space. Thus, finding negotiable grounds to present clear and unified measures of space arms control is a challenging task. Taking these conditions into consideration, we attempt to propose viable and implementable measures of space arms control that will coordinate the interests of various nations. These measures will be based on principles such as “settling easy issues first, resolving more difficult matters later” and “methods of progression and phases.” In addition, we will search for solutions with regard to space arms control within the current international norms and the making of new international laws. The Ottawa process, which aims for a regional cooperative model as appropriate measures, will be applied for this end.

It does not address placing conventional weapons in orbit around the Moon. Important prohibitions on deploying and testing anti-ballistic missile (ABM) systems in space and on interfering with national technical means (NTM) operated for verification purposes were enshrined in the 1972 ABM Treaty, deemed void following US withdrawal in June 2002. The principle of non-interference with NTM was also enshrined in the 1987 Intermediate Nuclear Forces (INF) Treaty and the 1991 Strategic Arms Reduction Treaty (START I). START I also prohibited the production, testing and deployment of “systems, including missiles, for placing nuclear weapons or any other kinds of weapons of mass destruction into Earth orbit or a fraction of an Earth orbit” and contained transparency and confidence-building provisions. It reinforced the provisions of the 1988 Ballistic Missile Launch Notification Agreement, providing for advance launch notification of ballistic missiles used as boosters to put objects into the upper atmosphere or space. George

Bunn and John Rhinelander, legal advisers to earlier US Administrations, have argued that the OST created an “overall rule [that] space shall be preserved for peaceful purposes for all countries”. The question of verification of arms control treaties is often narrowed down to particular verification problems or to technical capabilities of (existing) monitoring systems. In so doing, it is generally ignored that broadly accepted verification principles should also be defined. This is important because treaty verifiability is not a precisely measurable value in itself but should be evaluated in the context of the security risks associated with or prevented by treaty compliance. It is therefore useful to keep in mind a few principles of verification.<sup>18)</sup>

Proposals were advanced to overcome the longstanding stagnation of efforts to enhance global security and prevent the weaponization of outer space. Russia and China proposed the establishment of a Group of Governmental Experts (GGE) to make recommendations on Prevention of an Arms Race in Outer Space (PAROS), which has been stalled on the agenda of the Conference on Disarmament (CD) for almost three decades. And sponsors of what is now an annual resolution on Transparency and Confidence-Building Measures (TCBMs) in outer space supported discussion of practical implementation measures at the UN Disarmament Commission.<sup>19)</sup> There was

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18) Regina HAGEN and Jürgen SCHEFFRAN, “Is a space weapons ban feasible?, Thoughts on technology and verification of arms control in space.” principles of verification.is as follows :

- Arms control should enhance international stability and reduce the risk of an unrestrained arms race.
- A proper balance should be maintained between the activities that ought to be verified (acceptance threshold) and the activities that can be verified (monitoring threshold).
- Generally, the expenditures for verification should be proportional to the security gain achieved and the risks that remain.
- Verification encompasses several parallel processes. In addition to technical monitoring systems, political, legal, diplomatic and military processes are important factors when it comes to assessing treaty compliance, predicting the risk of cheating and providing for sufficient time to initiate adequate countermeasures in the case of treaty violations.
- Due to the imperfection of available verification means, there remains a residual risk. This can be further reduced by defensive and cooperative measures that offset any advantage a party might gain by cheating.

19) Jessica West, Divisions on outer space security, December 6, 2017, Comments. Published

also support for efforts to advance multilateral negotiations of a new arms control treaty.<sup>20)</sup> States could not agree on how to confront the ongoing development of ASATs, the dual uses of anti-ballistic missile systems, and the potential deployment of ABMs in outer space. Should the focus be on weapons in space or the use of terrestrial-based anti-satellite weapons? Should states seek to negotiate new, legally binding measures in the CD or adopt voluntary actions? Potential for proliferation and parallels to nuclear weapons were raised by Kazakhstan and Pakistan, with the latter asserting that this time the burden of nonproliferation will not be borne by developing countries. The present report contains the study on outer space transparency and confidence building measures conducted by the Group of Governmental Experts on Transparency and Confidence -Building Measures in Outer Space Activities, which was established by the Secretary-General of the United Nations.<sup>21)</sup> According to Article III of the 1967 Outer Space Treaty, the major imperative for declaring the applicability of international law to outer space is the maintenance of international peace and security. However, the existing body of space resolutions, declarations and treaties provide only a few provisions which deal specifically with the activities of States in outer space which may threaten the peace and security of other States.

- The Final GGE Report

In July 2013, the GGE delivered its final report, approved by consensus, to the UN Secretary General. The UN General Assembly received and endorsed the report at its 68th session in late 2013, and encouraged UN Member States to review and

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in *The Ploughshares Monitor* Volume 38 Issue 4 Winter 2017.

20) Kazakhstan, members of the Collective Security Treaty Organization, Pakistan, Algeria, South Africa, Cuba, Bangladesh, Myanmar, and Venezuela specifically supported the draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects (PPWT), tabled by Russia and China in 2008 and 2014. But the United States, the European Union, Australia, France, Switzerland, and the United Kingdom, among others, had reservations about this specific text, particularly about the lack of a definition of space weapons, lack of verification, and silence on use of terrestrial anti-satellite weapons (ASATs).

21) Part I A/68/189 Report of the Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities Summary

implement the proposed measures through relevant national mechanisms on a voluntary basis. The report outlines conclusions and recommendations on TCBMs that can help ensure strategic stability in the space domain. Section IV through VIII then provide specific TCBMs for space, including this agenda.

We look at main Elements of UN TCBM and effort of arms control in outer space(as follow chart)

Main Elements of UN TCBM <sup>21</sup>	
•	Information exchange on national space policy and goals, and exchange of information on military space expenditures
•	Information exchange on activities in outer space including orbital parameters, possible conjunctions, natural space hazards and planned launches
•	Notifications on risk reductions such as scheduled maneuvers, uncontrolled high-risk re-entries, emergency situations and intentional orbital breakups
•	Voluntary visits to launch sites and command and control centers, and demonstration of space and rocket technologies

Contrast 1: Guidelines on Electromagnetic Interference	
•	[Agreed] Ensure the equitable, rational and efficient use of the radio frequency spectrum and the various orbital regions used by satellites
•	[Under discussion] Implement policy aimed at precluding interference with the operation of foreign space objects through unauthorized access to their on-board hardware and software

	PPWT	ICOC	UN TCBMs	LTS Guidelines
<b>Discussion Period</b>	since 2008	since 2009	2011-2013	since 2010
<b>Discussion Forum</b>	CD	no UN activity (Invitation Basis)	UN GGE	UN COPUOS STSC
<b>Initiated by</b>	Russia and China	EU	Russia and UNGA	UN COPUOS STSC
<b>Status</b>	Draft Treaty	Draft Code	Endorsed by UNGA	Draft Guidelines
<b>Legal Basis</b>	Legally binding	Voluntary	Voluntary	Voluntary
<b>Type</b>	Arms control	Code of Conduct	TCBMs	Technical Implementation
<b>Supporters</b>	China and Russia (Europe absent)	Major space-faring nations but China and Russia	All	<i>Still under discussions but similar pattern as in ICOC</i>
<b>Opponents</b>	United States	China and Russia NAM, Latin and African Countries	-	

2 April 2018, UN Disarmament Commission debates ways to prevent arms race in outer space Despite the deteriorating security situation, there are some signs of progress in the field of disarmament. This commission has also included prevention of an arms race in outer space in its agenda for this session. “One

specific collateral measure for disarmament on which this body should certainly be able to make a contribution is the goal of preserving outer space as a realm free of conflict,” Mr. Markram said,<sup>22)</sup> These include: the massive growth in the number and diversity of actors operating in outer space, including governments and the private sector; the proliferation of hazardous space debris; and increasing dependence on outer space in the civilian, government and military sectors. “As long as some continue to see outer space as a potential realm for war-fighting, we will face increasing risk of weaponization and conflict,”

One side nations supported legally binding measurement on prevention of arms race in outer space.<sup>23)</sup> Other side nations supported and preferred TCBM on prevention of arms race in outer space. Australia stressed the goal of preserving outer space as a realm free of conflict was one such measure to which the Commission could contribute. As long as some continued to see outer space as a potential realm for war, there would be an increasing risk of weaponization and conflict. Despite geopolitical and strategic tensions, major spacefaring nations and other space actors continued to find common ground, including through transparency and confidence building measures. Argentina called for its maintenance as a demilitarized arena, adding that confidence building measures were both appropriate and necessary.

US expressed opinion respect to the Working Group on outer space, he said it was unfortunate that some countries believed that the ability to attack space assets offered an asymmetric advantage, and, as a result, were pursuing a range of antisatellite weapons. While the US would prefer that the space domain remained free of conflict, it would meet and overcome any challenges that arose.

Republic of Korea welcomed the inclusion of an agenda item related to outer space activities, he voiced support proposal on transparency and confidence building measures in that arena, stressing that discussions should focus on

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22) UN News, April 2 2018, UN Disarmament Commission.

23) Indonesia, Chile, Ecuador, Cuba, China, Brazil, Bangladesh, Nigeria, Tunisia, Algeria, Costa Rica Russian Federation. Russian expressed support for the objective of preventing an arms race in outer space and described the proposal by his delegation, along with China, as a “full fledged multilateral initiative” towards that goal.



establishing norms of behaviour to promote safety in outer space activities.

Some nations stressed and proposed Regional cooperation and international cooperation. Namibia, Nigeria and so on. Namibia said that outer space should be free of nuclear weapons, as their presence constituted an existential threat to global peace and the future survival of humanity. Outer space should be explored and utilized exclusively for peaceful purposes and for the benefit of all States.

Also, South Africa stressed the importance of international cooperation and dialogue, adding that there was no alternative to open and transparent multilateral processes in which all interested States could participate on an equal footing.

Today, the world has essentially reached a consensus that there is insufficient time to reach a legally-binding space arms treaty by the early 2020s. Still, to reap the three benefits of arms control in countering robotic and other threats for the longer-term, say, in the 2030s and beyond.<sup>24)</sup>

## IV. Propose of Measures of Space Arms Control

### 1. Basic Arms Control

Basic Arms Control is TCBMs. Therefore are voluntary protocols by which states opt to abide. They are not usually legally binding or inclusive of verification mechanisms. Instead, they work to promote dialogue and interaction, facilitate information-sharing and increase trust between states. TCBMs are easier and arguably quicker to negotiate and implement than treaty-based regimes. Negotiating a TCBM for outer space activities, for instance, could circumvent difficult definitional issues such as space weapons, peaceful uses or even outer space.<sup>25)</sup>

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24) Brian Chow, "Is It Time for 'Space Arms Control'?", *The National Interest* (<https://nationalinterest.org>), December 9, 2018

25) Shin, Dong-Chun, Cho, Hong-Je, op. cit., pp.222-223.

TCBMs also do not require parliamentary ratification, and are therefore more expeditiously implemented. There are several precedents for TCBMs governing military and commercial activities. Some of the more successful TCBMs include the Hague Code of Conduct for Missile Proliferation, or the Incidents at Sea and Prevention of Dangerous Military Activities Agreement. Such precedents further contribute to the attractiveness and feasibility of a TCBM approach. Such a code of conduct, while not necessarily legally binding, does not preclude the possibilities of a future treaty; rather, it could be complementary or elemental to a future, multilaterally - negotiated, legally binding mechanism. It has already amassed significant support from various militaries, national and international space agencies and commercial space industry leaders. Confidence-building measures, while promoting dialogue and cooperation, are not long-term answers. Short of becoming law, they do not constitute a global norm. Their non-binding nature results in ambiguous compliance. Such a code of conduct advocated by the Stimson Center would seek to: a) avoid collisions and dangerous maneuvers in space, b) create special “caution and safety areas” around satellites, c) develop safer traffic management practices in space, d) prohibit simulated attacks and anti-satellite tests in space, e) facilitate information exchanges, transparency and launch notification measures, and f) encourage more stringent space debris mitigation measures.

Space debris caused by peaceful uses may be mitigated, but such mitigation is rendered irrelevant in the face of the dangers posed by potential weaponization of outer space. Moreover, focusing on such a limited regulatory system may detract from the momentum to address these longer-term threats.

## 2. Structural Arms Control

### (1) Strengthening Existing Legislation

There are few international legal instruments dealing with the military uses of outer space.<sup>26)</sup> The ABM Treaty, to a certain extent, was one of them. As its title

implies, the Treaty between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Anti-Ballistic Missile Systems of 26 May 1972, aimed at “ending an emerging competition in defensive systems which threatened to spur offensive competition to still greater heights”<sup>27</sup>).

There are already a number of international instruments with jurisdiction over space activities. The most important is the OST, which provides a basic framework for space activities. Enshrining the principles of peaceful use and exploration, and that outer space should be available for the benefit of all (not subject to national appropriation by sovereignty claims), the OST has 102 parties, including China, France, India, Israel, Pakistan, the Russian Federation, the United Kingdom and the United States. It prohibits the stationing of WMD, including nuclear weapons, in space orbit or on celestial bodies. It does not cover the transit of nuclear weapons (on ballistic missiles) through space or prohibit nuclear weapons launched from Earth into space for the purposes of destroying incoming missiles. It also says nothing about ASATs or the placement of conventionally armed weapons in space. Other relevant treaties include the 1963 Partial Test Ban Treaty (PTBT), which banned nuclear testing in outer space, and the Moon Agreement of 1979, which confirmed many of the provisions of the OST, with specific reference to the Moon. Endorsing that OST parties should make use of this provision and request formal consultations with the United States, Jonathan Dean also proposed that nations could pass a resolution in the General Assembly to request the International Court of Justice (ICJ) to give an advisory opinion on whether testing or orbiting space weapons of any kind would be contrary to the core rule and objective of the OST that space be maintained for peaceful purposes. On the grounds that the testing or use of space weapons would jeopardize national technical means of verification, enshrined in several

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26) Ioannis Tziouras, Working Paper No 3, Common security in outer space Envisaging an effective arms control regime, December 2008, HELLENIC FOUNDATION FOR EUROPEAN AND FOREIGN POLICY, pp.3-5.

27) Arms Control and Disarmament Agreements. Texts and histories of negotiations. Washington DC: US Arms Control and Disarmament Agency, 1982, p.132.

treaties and agreements, and the commercial uses of space, he also suggests that legal action could be taken to prevent such threats, utilizing international and US courts, as appropriate.

## **(2) National and Regional Approaches**

Although few parliaments have yet begun to pay attention to space security as an issue, it is beginning to be linked with rising international concern about missile defense. The European Parliament has issued periodic reports on Europe and space. By contrast with the US emphasis on the military uses of space, the most recent European Parliament report emphasized that space activities should only be for peaceful purposes, including scientific knowledge, with “benefits for research, industry and society as a whole”, including the European Space Agency (ESA) and a future satellite system for global environment monitoring. The report also identified “protection and management of the space environment” as a major policy goal and warned that the European Union could be taking its first step towards the militarization of space with the GALILEO navigation/location system, intelligence-gathering and the Global Monitoring for Environment and Security (GMES) initiative. The European Union’s emphasis on social and economic benefits and on managing the environment is reinforced by France, Europe’s leading space faring nation and a prime mover behind ESA. Among US allies in Europe, France has been more keen than most to challenge Washington over missile defense and space policy, and has in the past advocated greater action on PAROS in the CD than the United States is willing to contemplate. Britain, like France, has an active space program, with significant investment in space-based telecommunications, remote sensing, surveillance and intelligence-gathering.

## **(3) Cooperative Space Situational Awareness**

The hypothesis is that spacefaring countries should unite to pool their resources in monitoring outer space and sharing the data about the location, trajectory, and

attributes of space objects. This enhanced “space situational awareness” (“SSA”) would enable all interested states to use space more effectively by avoiding collisions and by clarifying the nature of untoward events, and it could also form the basis of a verification regime to support the two previous measures.<sup>28)</sup>

## V. Conclusion

Such a code of conduct, while not necessarily legally binding, does not preclude the possibilities of a future treaty. It has already amassed significant support from various militaries, national and international space agencies and commercial space industry leaders. Confidence-building measures, while promoting dialogue and cooperation, are not long-term answers. Short of becoming law, they do not constitute a global norm. Their non-binding nature results in ambiguous compliance. While ongoing developments of outer space have contributed positively to the overall well-being of mankind, there have been mounting concerns that the last frontier may also turn into a political and economic battlefield. Numerous experts have foreseen a high possibility of a space arms race among dominating space powers such as the US and Russia and other emerging nations as they actively attempt to utilize space for military uses. Public opinion is growing with regard to increased measures through various international bodies, including the UN, in guaranteeing the peaceful use of outer space and preventing the space arms race.

However, it is very difficult to secure international cooperation due to the narrow view on space arms control and national security, owing to the conflict of interests among nations in regard to their development of weapons and positions they hold in the international society. The outstanding example is that The United States which has been holding the position of the most advanced

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28) David A. Koplow, *The Fault Is Not in Our Stars: Avoiding an Arms Race in Outer Space*, volume 59 , Number 2, *Harvard International Law Journal*. 331 (2018), P.372.

space power withdrew from OST in early 2000s, which would be very harmful to the efforts of arms control in space by international community. Nevertheless, a long-term and systematic approach is essential to utilize space for peaceful purposes and establish it as a common heritage of mankind (CHM).

Proposals were advanced to overcome the longstanding stagnation of efforts to enhance global security and prevent the weaponization of outer space. Russia and China proposed the establishment of a GGE to make recommendations on PAROS, which has been stalled on the agenda of the CD for almost three decades. And sponsors of what is now an annual resolution on TCBMs in outer space supported discussion of practical implementation measures at the UN Disarmament Commission. To some extent the deadlock over the PPWT has also represented a proxy battle with respect to the acceptability of legally binding arms control accords in the current geopolitical environment. The US continues to claim that “it is not opposed to space arms control agreements in principle” but it appears to be so in practice, having made no proposal of its own or endorsed any other. In his statement to the 2015 UN General Assembly First Committee debate on outer space, US Ambassador Robert A. Wood said “In contrast to the approach advocated by some States to pursue protracted negotiations to conclude a legally binding instrument, the United States is convinced that many outer space challenges confronting us could be addressed through practical, near-term initiatives, such as non-legally binding TCBM.” Considering confidence building measures, cooperative measures, regional cooperative measures, and other measures of space arms control, the possibility of realization of long-term measures in that they could constitute the international norms which would have binding force, with the international community to mutually assist each other. Also, In order to prevent a space arms race, it is necessary to take comprehensive cooperative measures within a global framework, with the aid of the UN to join in the cooperation of Space Powers. South Korea has recently been implementing the program to join the space club and participate in the effort for the prevention of the space arms race in the international community. It is advised to bear more

responsibility in carrying out its space- related activities, in particular on the part of the government and to even lead space arms control measures. South Korea should actively urge and encourage cooperation among the international community to identify commercial and military space activities that would increase threats to peace and harm the environment of outer space, e.g. space debris. South and North Korea should cooperate with regard to space development and prevention of arms race on the Korean Peninsula. Also, it is important to create regional agency for strengthening cooperation within the Asian space community towards joint undertakings. Outer space used to promote the interests of all mankind, rather than the advancement of a few at the expense of others.<sup>29)</sup>

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29) SPACE THREAT ASSESSMENT 2018 Authors TODD HARRISON KAITLYN JOHNSON, THOMAS G. ROBERTS, APRIL 2018 A REPORT OF THE CSIS AEROSPACE SECURITY PROJECT.

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## 초 록

스푸트니크 1호 발사 이래 60년이 지난 지금 우주에 대한 고려 없이 경제적, 정치적인 인간의 삶을 생각하는 것은 불가능해졌다. 그러나 우주가 전쟁의 장이 될 수 있다는 우려도 확산되고 있다. 따라서 우주상 군비경쟁을 방지하기 위한 여론이 더욱 커지고 있다. 따라서 우주상 군비경쟁을 방지하기 위한 행동규범이나 국제법을 설정하는 것이 필요하다. 그러나 국제 사회에서 각국의 입장과 이해 상충으로 인해 구속력 있는 우주 군비통제방안을 수립하는 것은 매우 어렵다. 그럼에도 불구하고 우주의 평화적 이용을 위해서는 장기적이고 지속적이며 체계적인 접근이 필수적이다. 모든 국가는 국익이나 우주 개발 수준에 따라 입장이 다르기 때문에 포괄적 조약을 체결하기 위한 조건은 아직 성숙하지 못했다. 그러나 우주의 지속적인 개발을 위한 우주행동 강령 및 우주 과편에 대한 협력체계 구축 노력 뿐만 아니라 발사 통지와 같은 실용적이고 투명한 신뢰구축 방안에 대한 협력을 지속적으로 추진해야 할 것이다. 우주강국과 개발 국가들의 자발적인 참여를 확보하기가 쉬운 연성적인 조치 (TCBM, 행동 규범)로부터 시작하여 포괄적이고 구속력 있는 조약과 같은 경성적인 조치가 단계적으로 이루어져야 할 것이다. 또한 군비통제 이론에 입각하여 상호정보와 인력을 교환하고 정보를 공유하는 대화의 장을 지속적으로 만들어 나가야 할 것이다. 이러한 노력에 우주강국(미국, 러시아, 중국)이 적극적으로 참여한다면 국제 평화에 기여하게 될 것이다. 또한 지역간 협력을 통해 파트너십을 증진할 필요도 있다. 우주법의 효율성을 제고하기 위해 더 많은 국가가 기존의 국제법에 참여하도록 여론을 형성하고 주도해 나가야 할 것이다. 이러한 노력들이 우주의 안보력 강화에 기여하게 될 것이다.

**주제어:** 군사적 우주활동, 우주무기, 군비경쟁, 군비통제, 신뢰구축조치, PAROS, 우주법

## Abstract

### Militarization of Space and Arms Control

Hong-Je Cho\*

In the sixty year since the first launch of Sputnik 1, it has become impossible to consider economic, political, or scientific human life in the communication field without reference to outer space. But, there is a growing groundswell of public opinion aimed at preventing arms race in space. Therefore it is necessary to establish some institution or mechanism such a code of conduct, international law. But every nation has a different posture on the grounds of national interest, or different levels of space development, the conditions required for the successful negotiation of a comprehensive treaty are not yet ripe. It is hoped that by beginning with soft measures (TCBM, Code of Conduct) for which it is easier to secure voluntary participation it may be possible to build up to a comprehensive treaty. The participation of the Space powers (US, Russia, China) in a dialogue of mutual exchange and shared information would contribute to international peace and give a long term benefit to humankind. It is also necessary to promote partnership through regional and bilateral cooperation. We should guide and shape opinion so that more nations ratify and sign existing international legal covenants in order to contribute to the efficiency of Space law. International law needs to enforce PAROS and Space Security.

**Key words** : Military Space, Space Security, Space weapons, Arms Control, TCMB, PAROS, Space Law.

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