This article from International Institute of Space Law is published by Eleven international publishing and made available to anonieme bezoeker

(IAC-08-E8.2.11)
"SPACE TRAFFIC MANAGEMENT" FOR THE PREVENTION OF WEAPONIZATION OF OUTER SPACE

Setsuko AOKI
Faculty of Policy Management, Keio University, Japan
aosets@sfc.keio.ac.jp

Abstract

Since the setting-up of the CD, no proposals have been endorsed for the further discussions to adopt a treaty on the prevention of weaponization in outer space, and today, it seems difficult to even re-establish the ad hoc Committee on Prevention of Arms Race in Outer Space (PAROS). In contrast, entering into the 21st century, the notion of "space traffic management" (STM) has become prevalent in securing safety use of outer space. STM has been introduced as a broad concept including the space debris mitigation measures, frequencies and slot management, the pre-launch notification systems and concrete space traffic rules. Can the pursuit of the STM (space safety) be a proxy to the arms control measures (space security)? The conclusion would be positive if the following conditions are satisfied: (1) As a goal, emphasis is to be placed upon the safety itself, not security; (2) definition of space weapons, weaponization, or ASAT would be carefully avoided; (3) soft law frameworks would be selected; and (4) such soft law frameworks are adopted and carried out by the like-minded states outside the CD as a first step.

1. INTRODUCTION

It has been fourteen years since the re-establishment of the ad hoc Committee on the Prevention of Arms Race in Outer Space (PAROS) became impossible at the Conference on Disarmament (CD). It is true that various proposals have been repeatedly submitted to the plenary of the CD after 1995, but without any possibility of being seriously considered. The latest United States National Space Policy (2006), denying the possibility of entering into the negotiating the arms control agreements in outer space [1], is not encouraging either, to say the least. China's Anti-Satellite (ASAT) test in January 2007 also increased the concerns

[1] **U.S. National Space Policy (2006), Point 6 in "2. Principles".**

Copyright © 2009 by S. Aoki. Published by the American Institute of Aeronautics and Astronautics, Inc., with permission.

This article from International Institute of Space Law is published by Eleven international publishing and made available to anonieme bezoeker

for the possible "weaponization" of outer space in the international community.

In the stalemate of the pursuing PAROS, alternative approaches have to be considered in order to maintain and improve the peaceful uses of outer space. Entering into the 21st century, the different approaches are gradually becoming prevalent. Such alternative approaches include pursuing a code of conduct on Transparency and Confidence Building Measures (TCBM) at the United Nations (UN) and promoting an international agreement with respect to the comprehensive space safety schemes in the name of "Space Traffic Management".

The purpose of this article is to study if the pursuit of safety measures for space activities could be a substitute of the agreement of the prevention of weaponization in outer space.

2 ACHIEVEMENTS AND LIMITATIONS OF THE CD

2.1 Military Use of Outer Space as a Stabilizing Effect.

Military use of outer space is one of the major motivations by the leading spacefaring states since the advent of the space development. Although it was not until 1978 when the US government officially acknowledged its use of photo-reconnaissance satellites for national security purposes, [2] it was internationally well recognized already in 1970's that the "national technical means of verification", [3] including satellite monitoring, carried out by the then both superpowers, made it possible to reach the bilateral arms control agreements including the SALT I (1972-1977), ABM Treaty (1972-2002), Threshold Test Ban Treaty (TTBT) (1974), Peaceful Nuclear Explosions Treaty (PNE) (1976) and SALT II (1979, not entered into force). Based on the hypothesis that the multilateral satellite monitoring systems would contribute to building confidence among international community, as the satellite-based monitoring by the superpowers increased the stability of the bilateral relationship by verifying the other Party's compliance with the treaty provisions, France proposed the setting-up of the International Satellite Monitoring Agency (ISMA) at the first Special Session of the General Assembly (SSOD I) held in 1978.[4] Military uses of

[2] See, e.g., S.A. Cohen, "SALT Verification: The Evolution of Soviet Views and their Meaning for the Future" (1980) 24 *Orbis* 657, pp. 661-662. The Soviet Union admitted using satellites to monitor SALT I accord in 1972. Ibid.

[3] See, e.g., Article V of the SALT I, Article XII of the ABM Treaty, Article II of the TTBT and Article IV of the PNE.

[4] A/S-10/AC.1/8 (1978). Also, see, paragraph 125 (d) of the Final Documents

This article from International Institute of Space Law is published by Eleven international publishing and made available to anonieme bezoeker

outer space, at least some category of which, was not only been tolerated as the deplorable reality, but also being positively acknowledged as having stabilizing effects for the international community already around the end of the 1970's.

2.2 Three Categories of Proposals at the CD

The scope of the permissible military use has been the subject of the CD[5] since its establishment in 1979. However, no consensus has been reached on which kind of military uses shall be prohibited up until today irrespective of the various draft articles, institutional proposals and other schemes on the PAROS. While a variety of proposals have been made at the CD at the first look, the contents of major parts of the proposals are often similar. In other words, the similar proposals have been repeatedly submitted for almost three decades in order to pursue PAROS.[6] In order to find the measures to surmount the obstacles to reach consensus for the weaponization of outer space, it seems useful briefly studying the achievements and limitations of the PAROS proposals. Proposals submitted to the CD can be categorized into three:

(1) prohibition of the "weaponization" of outer space (comprehensive approach) ;

(2) prohibition of the ASAT weapons (individual approach); and

(3) TCBM as a first step.

Briefly, the present writer summarized the characteristics of the each category of proposals and the present situation, and concluded which category would have more possibility to be realized.

2.3 Prohibition of the "Weaponization" of Outer Space

2.3.1 General Trends

Among the various proposals found in this category, or prohibition of "weaponization" of outer space, some proposals define "space weapons" clearly, and others only provide for the type of behaviors or actions to be refrained from by the State Parties to a future Treaty. In case when "space weapons" are defined, differences exist in contents. Many proposals define space weapons based on their deployment positions and/or on their target positions. In those cases, some definitions include weapons to target to space and to the Earth from space and on

---

of the SSOD I, A/S-10/2 (1978).

[5] Committee on Disarmament (CD) , established based on the Final Documents of the SSOD I was renamed as Conference on Disarmament (CD) in 1984. A/S-10/2, para. 120.

[6] As a comprehensive guide on the various proposals, see, e.g., "Basic Documents of the Conference on Disarmament Related to the Prevention of Arms Race- Compilation Prepared by the Secretariat", CD/INF.50 (23 May 2006).

This article from International Institute of Space Law is published by Eleven international publishing and made available to anonieme bezoeker

the Earth and others exclude weapons placed on the Earth to target the objects in space. [7] Some school of thoughts suggests that space weapons are weapons deployed in outer space regardless of their target position. The problem of this definition lies in the fact that currently outer space remains to be defined.

Also, pursuant to some definitions, space weapons are deemed as only devices which are specifically designed and developed to attack, destroy or damage other objects. According to other definitions, weapons capable of attacking, destroying or damaging other objects are judged as space weapons. In the latter case, e.g., manned space vehicles used for scientific purposes can be regarded as a potential space weapon. [8]

The most crucial difference is whether to take weapons deployed in areas other than outer space which target outer space object shall be defined as space weapons or not. Reaching a consensus on this specific point seems impossible since the view directly relates to the political position of a state if it would approve of the part of the ABM systems or Strategic Defense Initiatives (SDI), or since 1990's, missile defense (MD) systems to be deployed in space.

The following is the summarized process of the failure of the CD about reaching a consensus on weaponization of outer space. From the history, the conditions of possible measures for maintaining the peaceful uses of outer space could be found out.

2.3.2 Milestone Proposals at the CD

One of the earliest proposals on this subject was submitted by Italy in 1979, which requested that the wording of Article IV of the Outer Space Treaty (OST) be amended from the banning of the weapons of mass destruction in outer space to simply weapons of any other kinds in space. Italian proposal does not clearly define the deployment positions or target positions of prohibited space weapons. [9] Likewise, as mentioned above, similar provisions are found today, e.g., in the latest draft treaty proposal at the CD by China and Russia in 2008 (CD/1839).

The concept of "weaponization" was also established by the mid 1980's.[10] CD Report of 1986 session shows some examples of the definitions of "weaponization" of outer space, which

[7] Some proposals do not explicitly specify the deployment positions or target positions. See, e.g., CD/1487 (1988); CD/1549 (1999), p.1.

[8] See, e.g., CD/PV.170 (1982), pp. 14-15.

[9] CD/9 (1979), p.1. Italian proposal prohibits the development and use of any land- or space-based systems which are specifically designed to damage, destroy, or interfere with the operation of foreign satellites. Ibid.

[10] See, e.g., CD/641 (1985); CD/726 (1986).

This article from International Institute of Space Law is published by Eleven international publishing and made available to anonieme bezoeker

remains the same even today.[11] It is identified that weaponization is the existence of "weapons systems in space or directed against targets in space".[12] Militarization of space, is, on the other hand, regarded as supporting of military systems and military operations on the Earth as an integral part of the whole weapons systems.[13] Such line of thought was reflected in, for instance, Chinese statement in 1985.

China stated in 1985 that the primary objective at that stage in the efforts to PAROS should be the "de-weaponization" of outer space, i.e., the banning the development, testing, production, deployment and use of any space weapons and the thorough destruction of all space weapons"[14] with the limited and prohibited use of military satellites of all types as the ultimate goal in mind.[15] For China, "space weapons should include all devices or installations either space-, land-, sea-, or atmosphere-based", which are designed to attack or damage space craft in outer space, or disrupt their normal functioning, or change their orbits; and all devices or installations based in space (including those based on the moon and other celestial bodies) which are designed to attack or damage objects in the atmosphere, or on land, or at sea, or disrupt their normal functioning. This is the most comprehensive definition of space weapons, repeatedly seen in the proposals in later years to date.[16]

Among the two of the Venezuelan proposals made in 1986 and 1988 respectively, the later one defines the space weapons in a comprehensive manner. It defines space weapons as "any offensive and defensive device, including its operational components, whatever the scientific principle on which its functioning is based: (a) capable of destroying or damaging from its place of deployment in outer space an object situated in outer space, in the air, in water or on land; (b) capable of destroying or damaging from its place of deployment in the air, in water or on land an object situated in outer space."[17] Venezuela went on to state that "[t]he following are also space weapons: any offensive or defensive device, including its operational components, and any system of such devices, whatever the scientific principle on which its functioning is based, that is capable of intercepting, from outer space or from land, water or the atmosphere,

[11] CD/726 (1986), pp.4-5.
[12] Ibid., p.4.
[13] Ibid.
[14] CD/679 (1985), para.5.
[15] Ibid., para.3.

[16] Parts of the ABM systems, SDI, and MD systems could be categorized as space weapons pursuant to this type of definition, depending on how "space object" should be defined. See, infra.
[17] CD/851, CD/S/WP.24 (1988), p.1.

This article from International Institute of Space Law is published by Eleven international publishing and made available to anonieme bezoeker

ballistic projectiles during their flight."[18] While 1986 Venezuelan proposal did not clearly include weapons to damage or destroy from space to another space object in space, [19] 1988 proposal comprehensively includes weapons systems and components, from space to space, space to the Earth and the Earth to Space. By this comprehensive definition, ABM systems and then being developed Strategic Defense Initiative (SDI) could be comprised as a weapons to be forbidden. Bulgaria, Egypt, Mongol, Peru, Poland, and Zaire supported Venezuelan comprehensive definition of space weapons,[20] while majority of western countries regarded it too far-reaching to translate into a treaty provision in consideration of the ongoing ABM and SDI efforts. [21]

In the 21st century, Russia and China occasionally submit proposals on the PAROS. Joint proposal on a future treaty made in 2002 provides for the three basic obligations: first is not to place in orbit around the Earth any object carrying any kind of weapons, not to install such weapons on celestial bodies, or not to station such weapons in outer space in any other manner. Second obligation is not to resort to threat or use of force against outer space objects, and third is not to assist or encourage other States, groups of States, international organizations to participate in activities prohibited by this Treaty. [22] Space weapons are not defined in the proposal, but the working paper submitted to the CD four years later comprises the definitions of major technical terms. In that paper, an example of the definition of space weapons is cited as "any devices, installations or establishments based in outer space, including the Moon and other celestial bodies, which strike and damage objects in outer space, in the atmosphere, on the ground, in the sea or disrupt their normal functions, as well as any devices or installations based on the ground, in the sea or in the atmosphere, that strike and damage space objects, impair their normal functions or change their orbits."[23] It merits mentioning the model definition is not different from the Chinese statement 21 years before.

Latest proposal by China and Russia is the draft "treaty on prevention of the placement of weapons in outer space and of the threat or use of force against outer

[18] Ibid.
[19] CD/726 (1986), p.1. The narrower scope was the reason that some states did not support Venezuelan proposal including China, Sri Lanka and the USSR.
[20] CD/905, CD/OS/WP.28 (1989).
[21] CD/833 (1988), p.12.
[22] CD/1769 (2002). Note that the first obligation is the same as the Italian proposal in 1979.
[23] CD/1779 (2006), pp.2-3.

This article from International Institute of Space Law is published by Eleven international publishing and made available to anonieme bezoeker

space objects (PPWT)" made on 12 February 2008.[24] Basic obligation of the PPWT is the same as specified in CD/1679, a 2002 China and Russia joint proposal (Article II of the PPWT).[25] Notable is that the definitions of the key terms are added and the consideration is found on the selection of the key technical terms to gather understanding of the usually skeptical former western nations. Instead of space weapons, "weapons in space" is defined as "any device placed in outer space, based on any physical principle, which has been specially produced or converted to destroy, damage or disrupt the normal functioning of objects in outer space, on the Earth or in the Earth's human existence or inflict damage on them" (Art. I (c)). For the purposes of the draft treaty, outer space is 100 km above sea level (Art. I (a)) and the meaning of "placed" includes the case a weapon orbiting the Earth at least once, or following a sections of such an object before leaving this orbit in addition to the case permanently located somewhere in outer space (Art. I (d)). Thus, a ballistic missile (BM), Fractional Orbital Bombardment System (FOBS) type of weapons, or even interceptor of the missile defense systems may be interpreted as "weapons in space". That is one of the reasons that Slovenia, on behalf of the EU, stated on 28 February that "it remains a difficult challenge to achieve consensus on the definitions needed as for a legally binding instrument."[26] Canada also expressed its preference on soft law frameworks than the draft treaty considering non consensus exists on the technical, legal and political issues in this field. [27]

2.3.3 Conclusion

Without the consensus of the definition of space weapons, yet, the greatest common divisor exits in the concept of the term "weaponization" of outer space in that the central concept of which includes the manner of the space use exceeding the scope of defensive or passive military use of space. The notion seems widely shared that the space use aiming at supporting terrestrial military activities are, in principle, permissible, while testing or stationing a device or an object which is capable of attacking or damaging other

[24] CD/1839 (2008). The document was issued on 29 February 2008.

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

[26] EU Response to Russian Proposal of the draft PPWT, (28 February 2008) , p.2.

[27] CD/PV.1089 (2008), p.10.

This article from International Institute of Space Law is published by Eleven international publishing and made available to anonieme bezoeker

objects in outer space or on the Earth from outer space should be forbidden.

The lesson from the great efforts to pursue the prevention of weaponization of outer space is that defining "space weapons" shall be avoided if the consensus building is seriously sought out. It is too difficult technically, legally and politically. Without the definition, international community acknowledges the core part of "weaponization" and no country is publicly opposed to the prevention of weaponization. Political commitments, or soft law frameworks may fit to stop in advance weaponization of outer space.

2.4 Prohibition of the ASAT weapons

Considerable efforts have also been made to reach a consensus to ban the most pressing category of the space weapons, or anti-satellite (ASAT) weapons. However, since ASAT weapons themselves entailing a variety of types of devices, methods and scientific principles, defining ASAT weapons turned out to be as difficult as that of space weapons. Although all the proposals submitted were designed carefully to avoid too wide a definition of the ASAT weapon systems, no one proposal was given a reasonably positive reaction. Proposals submitted to the CD include the prohibition of high-altitude ASAT weapons,[28] banning of ASAT weapons in combination with immunity for satellites,[29] the elimination of existing ASAT weapons along with the banning of the development of a new ASAT capability [30] and multilateral moratorium of any anti-satellite activities.[31] Although there was no consensus on the legally impermissible scope of ASAT weapons and/or tests, starting the latter half of 1980's, the US and the USSR entered into a tacit understanding of moratorium on physical ASAT tests. Let aside the USSR which made a proposal on partial ASAT prohibition at the CD, it has to be taken note of that the US, in principle, supported the idea of the banning of the ASAT, while it opposed to define ASAT weapons as an impossible undertaking.[32] It may be said that it is the definition factor that constitutes the insurmountable obstacle, not the concept of PAROS itself.

2.5 TCBM as a First Step

It became clear that concluding a treaty for that subject was most difficult by

---

[28] Proposal by France and the Netherlands.CD/905, CD/OS/WP.28 (1989), p.10 & p. 13.
[29] Proposal by France. CD/936, CD/OS/WP/35 (1989), p.6.
[30] Proposal by the USSR. CD/PV.486 (1989), p.17.
[31] Proposal by India. Ibid., pp.15-16.
[32] CD/905, CD/OS/WP.28 (1989), pp.15-16.

This article from International Institute of Space Law is published by Eleven international publishing and made available to anonieme bezoeker

early 1990's at the latest. Then, focus was placed on the TCBM as a less unrealistic goal at CD.[33] Proposals were made often as a part of a soft law instrument such as "code of conduct", "rule of the road" or "rule of the behavior" because of the contents of commitments are not necessarily suitable for the legally-binding instruments and it is easier to be agreed upon. Major proposals for TCBM are as follows:

(a) Multilateral monitoring organizations to gather information in outer space

* PAXSAT A, space-to-space monitoring, proposed by Canada, first in 1987 and resurrected in 2006.[34]

* International Trajectory Centre (UNITRACE) proposed by France.[35]

(b) Pre-launch inspection

*International Space Inspectorate (ISI) by the UUSR.[36] The core of this USSR proposal is the multilateral on-site pre-launch inspection regime to verify that space objects to be launched would not possess space weapons.

(c) Strengthening the 1975 Registration Convention

A number of countries made proposals or supported the idea over the years. Registration Convention is not an arms control instruments, but a treaty to establish an international registry of space object for the purposes of providing practical effect to the 1972 Liability Convention. However, the transparency function of the Convention was taken note of at the CD.[37]

(d) The principle of non-interference among satellites

*Satellite immunity (France), keep-Out Zones and limitation on high velocity fly-bys (West Germany, France, etc.) [38]

*The establishment of minimum distances between space objects and speed limits imposed on space objects (West Germany).[39]

3. THE OUTLINE OF THE CONCEPT

[33] GARes45/55 (4 December 1990) for the first time requested that technical aspects of CBM be studied.

[34] CD/1785 (2006).

[35] CD/1092 CD/OS/WP.46 (1991) p. 5. Before UNITRACE proposal, see, e.g., CD/937 (1989) and CD/PV.570 (1989); ISMA, originally proposed by France in 1978 , was later proposed at various fora including the CD. A-S10/AC.1/7; A/C.1/33/PV.26 (1078); CD/641 (1985), para.4. ISMA is tasked with monitoring the earth not in outer space, but became a starting point of a series of French proposal such as Satellite Imaging Processing Agency (SIPA).

[36] CD/PV.385 (1987); CD/817 (1988). West Germany also maintained the necessity of the strict pre-launch notification with detailed parameters to notify. CD/905, CD/OS/WP.28 (1989) pp. 21-22.

[37] One of the first suggestions to the Convention for CBM measures is found at para.27 of CD/641 (1985), para. 27 of CD.786 (1987), para.24 of CD/833 (1988).

[38] CD/905,CD/OS/WP.28 (1989) pp.21-22; CD/1092, CD/OS/WP.46 (1991) p. 4.

[39] CD/786 (1987), para.27; CD/905/CD/OS/WP.28 (1989) p. 22.

This article from International Institute of Space Law is published by Eleven international publishing and made available to anonieme bezoeker

OF SPACE TRAFFIC MANAGEMENT IN THE IAA REPORT

3.1 Brief History

The concept of Space Traffic Management (STM) was gradually evolved among academic circles, especially through the two important workshops organized by American Institute of Aeronautics and Astronautics (AIAA) in 1999 and 2001[40]. During the 2001 workshop, it was suggested that the International Academy of Astronautics (IAA) should conduct an in-depth study on STM. IAA accepted it in late 2001 and set up an interdisciplinary study group of approximately 20 experts.[41] IAA report titled "Cosmic Study on Space Traffic Management" was published in 2006.[42]

For the purposes of the report, STM is defined as "the set of technical and regulatory provisions for promoting safe access into outer space, operations in outer space and return from outer space to Earth free from physical or radio-frequency interference." [43] Space security is, presently, often defined as "the secure and sustainable access to and use of space, and freedom from space-based threats".[44] The overlapping area in the definition may be a good opportunity for the arms control advocate and at the same time the major obstacles for the STM.

3.2 Summary of The IAA Report [45]

The IAA report in 2006 aims at an outline of a space traffic regime in 2020. The concept of the STM would relate to the whole stages of space activities from pre-launch and launch phase, to the in-orbit operation phase, and finally to the re-entry phase. Also, the dimension of management of STM comprises scientific and technical area as well as regulatory and legal fields. Among the findings in the report, regulatory and legal requirements for an effective STM are summarized below. [46]

---

[40] AIAA, *Proceedings of the International Cooperation: Solving Global Problems* (1999) pp. 35-59; AIAA, *Proceedings of the International Cooperation: Addressing Challenges for the New Millennium* (2001), pp. 7-14.

[41] See, e.g., Corinne Contant, Petr Lála, Kai-Uwe Schrogl, "Status of the IAA Study Group on "Traffic Management Rules for Space Operations", IAA 03-5.5a06, Space Debris and Space Traffic Management Symposium (2003, IAA), pp. 576-577.

[42] IAA, Cosmic Study on Space Traffic Management (IAA, 2006).

[43] IAA, ibid.

[44] See, e.g., Canadian statement at the 44th session of the Science and Technical Subcommittee (STSC) of the Committee on the Peaceful Purposes of Outer Space (COPUOS) on 21 February 2007. Originally, it is a definition of the spacesecurity.org. See, Space Security series of spacesecurity.org.

[45] Ibid.

[46] IAA Report points out 21 findings, among which those related to space law are cited below. Supra, note 42, p. 64, p.75 & p.89.

This article from International Institute of Space Law is published by Eleven international publishing and made available to anonieme bezoeker

3.2.1 The launch phase

(a) Safety certifications should be introduced.

(b) Clarification of the term "space object" is needed.

(c) The question of delimitation of air space and outer space should be revisited.

(d) The concept of "launching State" has to be clarified.

(e) A pre-launch notification system is necessary, although International Code of Conduct against Ballistic Missile Proliferation (widely known as Hague Code of Conduct: HCOC) includes non-regulatory binding provisions for such notifications of Space Launch Vehicle launches.

(f) Obligatory information in cases of damage is relevant.[47]

Among the six requirements, (a) and (e) relate to TCBM proposed at CD, especially ISI and the amendment of the Registration Convention. It is interesting that the IAA Report refers to the HCOC that imposes on the political commitment to prevent and curb the proliferation of ballistic missile systems capable of delivering weapons of mass destruction. Because of the similarity in functional principle between BM and space launch vehicles (SLV), subscribing states are obliged to provide launching information of BM and SLV in accordance with pre-launch notification mechanisms of the HCOC.[48] Drafted to supplement the task of Missile Technology Control Regime (MTCR), it was successfully adopted due to its non-binding nature of the instrument. While China and India are not subscribing states and the US postpones supplying pre-launch notifications, yet, it is remarkable that 130 states are now members to the TCBM mechanisms.[49] At least as a first step, a soft law framework has to be pursued to reach consensus in the fields of space security.

Points (b)-(d) and (f) are not unique for STM, but acknowledged as the pressing issues in general international space law[50].

3.2.2 The in-orbit operation phase

In this phase of activities, no specifically legal requirements are

[47] Ibid., p. 64.

[48] 4 iii) of the HCOC.

[49] When adopted in November 2002, the number of subscribing states to the HCOC was 93.

[50] Those issues are either currently being dealt with at the Legal Subcommittee (LSC) of the COPUOS or recently intensively discussed and solved to a certain degree, in most cases as UN General Assembly (GA) Resolutions. Examples would be the "application of the 'launching State' concept" and " recommendations on enhancing the practices of States and international organizations in registering space objects" adopted in 2004 and 2007 respectively in the part of the omnibus GA Resolutions under the title of "international cooperation in the peaceful uses of outer space". See, A/RES/59/115 (2004); A/RES/62/101 (2007).

This article from International Institute of Space Law is published by Eleven international publishing and made available to anonieme bezoeker

mentioned. Instead, the efforts and limitation of the activities by the ITU are specified.[51]

3.2.3. The re-entry phase

(a) Space law and air law have to resolve the open issue of passage of space objects through airspace.

(b) The question arises, whether to introduce certain internationally recognized descent corridors and possibly even impact areas which are not frequently used by other traffic, and which could be dedicated to space traffic. [52]

In this phase, reusable vehicles and de-orbit of space debris mitigation measures are largely involved. Space debris mitigation guidelines, adopted at the Inter-Agency Space Debris Coordination Committee (IADC) in 2002 [53]and the UN Space Debris Mitigation Guidelines endorsed by the GA resolution in 2007 [54]can be regarded as one kind of STM instruments, and a proxy to the arms control measures.

3.2.4 STM model in 2020

The report provides how a comprehensive STM model in 2020 will look like (in chapter 4). According to the Report, a STM regime will comprise four elements: (1) the securing the information needs, (2) a notification system, (3) substantive space traffic rules and finally (4) mechanisms and organizations for implementation. Needless to say, the correct information on where space objects are flying should constitute a sound basis for any successful traffic control. In the report, the required areas include (a) definition of necessary data, (b) provision of data, (c) establishment of a database and distribution mechanisms for data and (d) establishment of an information service on space weather.[55] Presently, space situational awareness (SSA), the precision knowledge about the space traffic is only in the possession of the US and Russia.[56] Thus, it seems quite a challenge establishing technical basis as good as or better than the US Space Surveillance Network (SSN) information systems open and accessible to all actors, states, organizations and private entities.[57]

The second element is a notification system. Currently, it is the task of the

[51] Ibid., p. 75.
[52] Ibid., p. 89.
[53] It was supplemented in 2004 and amended in 2007.
[54] A/AC.105/890 (2007), para.99 & Annex IV; A/62/20, II.C.3, paras.116-128 & Annex 4; A/RES/62/217 (distributed in 2008).
[55] IAA, supra, note 42, p 14 & p.91.
[56] Russian Space Surveillance System (SSS) is evaluated slightly less sensitive than the US SSN. See, e.g., Nicholas L. Johnson, "Space Traffic Management: Concept and Practices", *Space Policy*, vol.20 (2004), p. 82.
[57] IAA, supra, note42, p. 14 & p. 91.

This article from International Institute of Space Law is published by Eleven international publishing and made available to anonieme bezoeker

Registration Convention to which 51 states are parties as of April 2008, but the Convention has so far yielded the outcome less than satisfactory, partly because the obligatory notification provisions (Art. IV 1 (a)-(e)) insufficient and partly because the states parties are not duly abiding by the Convention. Required areas include (a) the adequate pre-launch notification of parameters, (b) the pre-notification of orbital manoeuvres and active de-orbiting and (c) the notification of the end of lifetime of objects, and re-entry. [58]

The third element is concrete traffic rules. Examples of space traffic rules, specified in the Report include (a) safety rules for launches for both unmanned vehicles and manned space flights, (b) rule on zoning (selection of orbits), (c) right-of-way rules for in-orbit phases, (d) prioritization with regard to maneuvers, (e) operational rules for GEO and LEO satellite constellations, (f) debris mitigation regulations, (g) safety rules for re-entry, and (h) environmental protection provisions in the atmosphere, troposphere, and on the earth .[59]

The fourth element is international control mechanisms. It is maintained that a legally-binding new international agreement designed specifically for the STM shall be adopted along with technical annexes modeled from the organizations such as International Civil Aviation Organization (ICAO) and International Maritime Organization (IMO).[60] After 2020, it is expected that "[t]he operative oversight- i.e. the task of space traffic management, could be taken up by an already existing forum or organization (such as UNCOPUOS/UNOOSA, or ICAO), which would evolve into a body shaped for that purpose. Looking 20 years later, it could also be handled by a non-governmental entity tasked by the State parties to an Outer Space Convention". ("Outer Space Convention" is a name for the future comprehensive treaty on space activities, which does not exist now.)

3.3 Lessons from the IAA Report

As drafters of the IAA Report admit that the STM regime would be realized "for decades now,"[61] and "the study does

[58] Ibid.

[59] Ibid. the numbering (a)-(h) is added by the present writer summarizing a number of possible rules specified in the Report; see, also, Kai-Uwe Schrogl, "Space Traffic Management", presentation at Space Policy Institute, The George Washington University, 24 January 2008, pp. 11-12.

[60] The Report foresees the possibility that both such a new international agreement and the present UN space treaties could be superseded by a comprehensive "Outer Space Convention" after 2020. Law of the Sea precedents might be envisioned. IAA, supra, note 42, p. 15 & p. 91.

[61] Kai-Uwe Schrogl, "Space Traffic Management: the New Comprehensive Approach for Regulating the Use of Outer Space", *ESPI Flash Report*, No.3,

This article from International Institute of Space Law is published by Eleven international publishing and made available to anonieme bezoeker

not, however, advocate a rush to regulation", [62] the primary contribution of the IAA Report is to clearly identify pressing issues for the global society and indicate a model procedure to address them. Thus, it is not fair if the Report would be evaluated by the possibility of reaching an international agreement of space traffic rules in the near future. Noting that, a certain instruction can be deduced from the Report.

First, a soft law framework has to be chosen if an agreed instrument for space safety is sincerely sought out. Relatively successful STM, space debris mitigation guidelines both at the IADC and the UN are crystallized in the form of guidelines.

A good example would be Guideline 4 of the UN space debris guidelines. It functions not only for space safety measures as a planned goal, but also a certain arms control (space security) measures. It provides that "[r]ecognizing that an increased risk of collision could pose a threat to space operations, the intentional destruction of any on-orbit spacecraft and launch vehicle orbital stages or other harmful activities that generate long-lived debris should be avoided. When intentional break-ups are necessary, they should be conducted at sufficiently low altitude to limit the orbital lifetime or resulting fragments." Although the double limitations can be pointed out in this guideline in that (a) intentional destruction is not forbidden, and (b) the guideline can not pose legally-binding obligations, it is certain that guideline 4 was possible because it was adopted as a soft law rule.

Second, aversion and reluctance of spacefaring nations to any additional restraints in the freedom of activities must not be underestimated. Unless the merits of traffic rules clearly exceed, the giving up of the long-cherished freedom of space would not be possible. Thus, any future STM measures have to be compatible with the established scope of military use of outer space. To decide what the established practices are, three decades discussions at the CD would certainly help.

Third, it seems difficult to implement space traffic rules and enforce sanctions in case of non-compliance with the rules, even if a legally-binding instrument was adopted. Needless to say if merely political commitments exist. Then, the it seems more important to reach the pertinent gentlemen's agreement[63] among

(October 2007), p. 3.

[62] Petr Lála, "Traffic Management Rules for Space Operations" *Astropolitics*, vol.2 (2004), p.128.

[63] Export control regimes such as Nuclear Suppliers Group (NSG), Australia Group (AG), MTCR and Wassenaar Arrangements (WA) would be good models to follow.

This article from International Institute of Space Law is published by Eleven international publishing and made available to anonieme bezoeker

like-minded countries, because through national legislation, the agreed rules are being implemented to a considerably reasonable degree. It cannot be too emphasized that harmonization of national legislation would play a critical role for the universal implementation.[64]

4 CODE OF CONDUCT ON SPACE TRAFFIC RULES

4.1 EU Proposal at the UNGA

On 18 September 2007, at the first Committee of GA, Portugal, on behalf of the EU, submitted a proposal on a comprehensive code of conduct on space objects and space activities for international space transparency and TCBM for the PAROS.[65] That proposal contains the concept of STM: "[t]he key activities to be covered under such a code of conduct could include, inter alia, the avoidance of collisions and deliberate explosions, the development of safer traffic-management practices, the provision of assurances through improved information exchanges, transparency and notification measures, and the adoption of more stringent space debris measures."[66] In the part of the implementation of the prospective code of conduct, enumerated best practices include avoidance of dangerous maneuvers for causing damage to space objects and for creating space debris, creating special areas of caution around satellites for the avoidance of collision, detailed information exchange on launching activities and enhanced registration system. The significance of using STM in a field of PAROS, or space security, cannot be too underlined. In the UNGA, STM is recommended as a possible alternative of arms control agreements. Considering overlapping recommended practices for the not necessarily the identical goal, a successful space traffic regime would have to be founded on the recognition that security use of outer space should be intact as long as such use is in accordance with the existing international space law and laws of arms control relevant to space activities.[67] In the name of STM, or a safety use of outer space, space activities would be restricted if it is not the strict legal obligations as the example of space debris mitigation measures. As time goes by, such restrictions might be crystallized into a customary international law rule. Otherwise, still, it is useful as a first step.

---

[64] Michael Gerhart, "Consequences of a Space Traffic Management Concept for National Space Legislation", IAA, ed., *Space Debris and Space Traffic Management Symposium 2004* (AAS, 2004), pp. 282-284.

[65] A/62/114/ Add.1 (2007), pp. 5-8.

[66] Ibid., p. 7.

[67] Ibid., p. 7, esp. 2.9.(c) .

This article from International Institute of Space Law is published by Eleven international publishing and made available to anonieme bezoeker

4.2 Private Code of Conduct- The Henry L. Stimson Center

Nongovernmental organizations from Canada, France, Japan, Russia and the US, organized by the US Henry L. Stimson Center, released on 24 October 2007 a model Code of Conduct for Responsible Space-Faring Nations to promote the peaceful uses of outer space. [68] It provides both for the rights of space-faring states (5 items) and responsibilities of space-faring states (9 items). Among the 9 responsibilities, the following items are concerned with STM measures. Again, it would be the example that the space safety measures may be pursued easier than the space security provisions. Provisions concerned are as follows:

4. The responsibility to develop and abide by rules of safe space operation and traffic management;

5. The responsibility to share information related to safe space operations and traffic management and to enhance cooperation on space situational awareness;

6. The responsibility to mitigate and minimize space debris in accordance with the best practices established by the international community in such agreements as the Inter-Agency Debris Coordination Committee guidelines and guidelines of the Scientific and Technical Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space; and

7. The responsibility to refrain from harmful interference against space objects.

Some of the measures among items 4-7 are discussed at the CD as TCBM, and item 6, at IADC and STSC of the COPUOS. TCBM considered at CD may be intentionally used as space safety measures at least for the time being to reach consensus for the purposes of adopting international instruments.

5 CONCLUSION

Ever larger number of actors along with a wider variety of activities in outer space would make it imperative to reach a certain agreement on space traffic rules, taking a long-term view. Using that logic, space safety measures may be crystallized into soft law instruments at least as a first step as a substitute of legally-binding space security agreements. Without such legally-binding agreements, access to space and operations there in safer

[68] The present writer is one of the participating nongovernmental experts who helped draft the model Code of Conduct. See, e.g., Michael Krepon, "Model Text of a Code of Conduct for Responsible Space-Faring Nations" (released on 27 October 2007).

This article from International Institute of Space Law is published by Eleven international publishing and made available to anonieme bezoeker

manner could be accomplished since the demarcation of customary international law and soft law has been blurring to some extent, and as the role of the national implementation is more important these days. It is possible that space safety measures represented by STM can be a proxy to arms control agreements with the conditions specified below would be satisfied:

(1) As a goal, emphasis is placed upon the safety, not security itself;

(2) Definition of "space weapons", "weaponization", "ASAT" and other key concepts are carefully avoided in the future international instruments;

(3) International instruments are made as soft law frameworks such as codes of conduct, guidelines, rules of the road, etc;

(4) Such soft law frameworks are, as a first step, adopted and implemented by the like-minded states outside the CD, since consensus-based adoption is almost impossible at the CD under the circumstances; and

(5) Such soft law frameworks are supported by the major space-faring nations.