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SPECIAL ISSUE ON SPACE LAW AND INTERNATIONAL ECONOMIC LAW

VOLUME III (2)
2010

AFFILIATED TO

STUDENT BAR ASSOCIATION AND MINISTRY OF COMMERCE CHAIR ON W.T.O.

NATIONAL LAW SCHOOL OF INDIA UNIVERSITY BANGALORE

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Introduction

The Indian Journal of International Economic Law is proud to present its very first special issue - an examination of the interface between space law and international economic law.

IJIEL has always followed the road less travelled. When the journal's first issue was released, we were possibly the only journal to apply a developing country perspective to the myriad issues of international trade. Now in the third year of the journal's existence, we have tried to raise the bar even higher. The underlying motivation for this special issue was a perpetuation of the basic philosophy behind IJIEL. We wanted to make a unique and valuable contribution. A thematic focus on the interaction between space law and international economic law fit this objective perfectly. This topic is interesting, important, and very neglected.

Humankind's knowledge and experience of outer space has increased exponentially in the last 60 years. Compared to most other fields of human knowledge this advance has been very rapid. A major reason for this focus and these developments has been the magnitude of the economic interests involved. There are definitely other reasons as well, but the lure of the immense economic potential of space exploration has played a large role in fuelling the rapid expansion of space activities. With the end of the cold war and limitations on the military use of space, the economic bases for space exploration have taken on even greater importance. A necessary corollary to this realisation, however, is the need to protect this economic basis. If economic gain forms the motivation for space exploration, economic returns must be assured. This demands regulation through a legal framework. Moreover, this legal framework must be international if it is to uphold the lofty goals of Art. 1 of the Outer Space Treaty in protecting "the interests of all countries". The need for an international framework is also reinforced by simple economic logic. The gains from cooperative space exploration will be significantly higher.

As we have mentioned, the adaptation of existing international economic law to space activities is a subject that has attracted relatively little attention. Also, existing efforts have mostly been based in space law perspectives. Through this special issue we hope to draw greater attention to these topics, by presenting a range of writings on niche and interesting areas, encompassing both public and private law.

Jason R Bonin and Fabio Tronchetti address some issues of tremendous contemporary importance in 'Constructing a Regulatory Regime for the Exploitation of the Resources on the Moon and other Celestial Bodies: A Balancing Act'. They address the legal regime governing appropriation of the resources of outer space, an issue which has been the subject of much attention in the context of lunar land rights.

Bin Li and Haifeng Zhao provide a national focus on the municipal legal regime governing regulation of space activities in China, in 'Governmental Regulation of Commercial Aspects of China's Space Activities'. This perspective is particularly important in the context of China's increasing prominence in space activities.

Valnora Leister draws attention to a fascinating issue in 'Economic Governance and Space Law'. Space law has always been governed by the rhetoric of 'common benefit', but this has always been missing in practice. This article explores a theoretical framework within which to place the 'common benefit' requirement, drawing on recent developments in commons utilisation.

Watcharachai Jirajindakul and Lalin Kovudhikulrungsri provide a second national perspective - a Thai one. Their article analyses the takeover of the Thai Shin Corporation by the Singaporean Temasek Holdings from the perspective of GATS rules and international space law. This article provides an important understanding of the loopholes in international space law in its application to real transactions.

Finally, in 'A New Liability Regime for the Space Sector - an Economic Imperative', Lotta Viikari addresses the complexities of the liability regime for space exploration. This article attempts to balance the imperatives of avoiding prohibitive liability regimes with the need to ensure compensation and incentivise diligence. To this end, a parallel is drawn with liability regimes for nuclear activity.

There are several people who have played a tremendously important role in ensuring the success of this endeavour. Above all, we must express our gratitude to Mr. Rajiv Luthra for his support to IJIEL as its patron. Thanks are also due to Dr. A. Jayagovind, IJIEL's faculty advisor and editor, as well as the student editorial board and guest editors.

Abhimanyu George Jain
Chief-Editor, IJIEL, 2009-10

Devina R. Deshpande
Convenor, IJIEL, 2009-10

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Foreword
The Basic Legal Order for Commercial Space Activities

Stephan Hobe[1]

Current commercial space activities include the use of telecommunication satellites, Earth observation by satellite (so-called remote sensing), and more recently navigation by satellites. Moreover, the space tourist business – whether on the basis of the International Space Station, or so-called sub-orbital character as perhaps offered in the future by Virgin Galactic – may also bring tangible commercial results. And finally, it is not yet known how much of the economic resources of the celestial bodies – i.e. helium-3 on the Moon, etc. – can be exploited and may help to solve pressing energy problems on Earth to the effect that it may be possible that without the dangers and byproducts of nuclear fusion energy problems can be solved.

It all starts with the guarantee of freedom for commercial space activities, whether in outer space or on celestial bodies, guaranteed in Article I of the Outer Space Treaty and Articles 4 and 11(4) respectively of the Moon Agreement. This fundamental freedom is subject to some other general limitations such as the prohibition of military uses (Art. IV Outer Space Treaty, Art. 3 Moon Agreement) and environmental concerns (Art. XI Outer Space Treaty, Arts. 2, 4(1) Moon Agreement). There are further limitations that explicitly or implicitly frame this freedom, but those are either not very clear or they are not explicitly drafted. Let us therefore now turn to these limitations which are somewhat difficult to demarcate precisely.

The Requirement of Common Benefit And Interest In Conducting Space Activities

According to Art. I, para 2 of the Outer Space Treaty, all States shall profit from space activities "on a basis of equality and in accordance with

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[1] Prof. Dr. Jur., Director of the Institute of Air and Space Law and Holder of the Chair for Public International Law, European Law, European and International Economic Law at the University of Cologne, Germany. The issues raised in this paper were discussed during the lecture on space law given at Bangalore National Law School of India University during his one week stay in August 2010.

international law". This brings in a specific non-discrimination focus to the effect that, in any concrete distribution order, for instance specific frequencies in the Geostationary Satellite Orbit, care should be taken that these frequencies are allocated on a non-discriminatory basis. On the other hand, Art. I, para 1 of the Outer Space Treaty asks to use outer space for the benefit and in the interest of all countries, marking space as the province of all mankind. Although it is not entirely clear what that means – such phrasing is typical for the drafting of the 1960s which were strongly influenced by the struggle for a new international economic order[2] – one can agree that it is in the interest of all mankind that no single State can exclusively use outer space for its benefit.[3] So, a certain degree of care shall be given to the interests of other States and the international community as a whole.

What, however, can this mean? Is a sharing in the benefits derived from the resources of outer space activities the aim of this provision? And how much shall be shared?

One can already sense a certain resistance on the side of technologically advanced, economically strong States which would then shy away from any investment if they feel deprived from the resources derived from these activities. But the imprecise wording can only lead to the result that no explicit limitation can be derived directly from Art. I, para. 1 of the Outer Space Treaty. The international community has confirmed this opinion. After eight years of deliberation, a United Nations General Assembly Resolution was drafted, entitled "Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, taking into Particular Account the Needs of Developing Countries"[3]. This Declaration was not an expression a legally binding nature, but indicated a certain *opinio juris* of States. Operative paragraph 2 clearly says that "States are free to determine all aspects of their participation in international cooperation in the exploration and use of outer space on an equitable and mutually accepted basis." It is thus

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3 For a typical statement of that time, *See* J. CASTANEDA, THE UNDERDEVELOPED NATIONS AND THE DEVELOPMENT OF INTERNATIONAL LAW, INTERNATIONAL ORGANIZATION 41 (1961).

4 *See* S. Hobe, *Article 1, in Marginal notes 49 – 53, in* S. HOBE/B. SCHMIDT-TEDD/K-U. SCHROGL (EDS.), COLOGNE COMMENTARY ON SPACE LAW, Vol. 1 (2009).

5 *United Nations General Assembly in its* Resolution 51/122 *entered into force on 13 December 1996.*

clear that States do not accept any one-sided limitation by law that does not interpret Art. I para. 1 of the Outer Space Treaty in such a way.

Non-Appropriation And The Moon Agreement

Next, it has to be clarified to what extent the Non-Appropriation Principle of the Outer Space Treaty (Art. II), which is repeated in Art. 11(2) of the Moon Agreement, provides for concrete limitations for the Moon and other celestial bodies. Again these provisions repeat the basic philosophy: no exclusive use by States shall be made through the taking of territory either in outer space or on celestial bodies. But it is not only the taking of territorial claims (Art. II Outer Space Treaty, Art. 2 Moon Agreement), use is also included in impermissible appropriation. Here, one important remark on treaty interpretation must be made. According to Art. 31 of the Vienna Convention on the Law of Treaties, the context of the wording is decisive: And the context clearly mentions the avoidance of exclusive territorial claims. Anything that amounts to such territorial claims shall be prohibited. Beyond that, the Outer Space Treaty is silent. In the view of the present author, therefore, Art. II of the Outer Space Treaty does not prohibit any commercial use of outer space or on celestial bodies. Rather, such uses are made dependent of the explicit legal order for the exploration of outer space, the Moon and other celestial bodies which shall be drafted later.

And we have such a draft – a rough draft – which, again, refrains from making any precise and final statement regarding our problem. This is the explicit exploitation order as laid down in the 1979 Moon Agreement. At the outset it must be noted has so far got only 14 ratifications. It is thus not very well accepted in the international community, a fact that has a lot to do with its text. This becomes apparent if one reads Art. 11(1) of the Moon Agreement in which the Moon and its resources are declared to be the common heritage of mankind. It has to be made clear from the beginning that, although the Law of the Sea Convention also mentions that the Deep Seabed and its resources are the common heritage of mankind, no uniform interpretation of this concept can be made. Rather, the concrete implementation of the concept in the respective legal order is overall decisive. This is repeated explicitly in the Moon Agreement which in Art. 11(1), when mentioning the common heritage

nature of the Moon and its resources, stipulates that this concept finds concrete expression in the further paragraphs of this Article. One important component is, of course, that neither the Moon nor the other celestial bodies are subject to national appropriation by claims of sovereignty or other claims. This is a repetition of Art. II OST.

More precisely, according to Art. 11(3) of the Moon Agreement, neither the surface nor the sub-surface of the Moon nor any part thereof or natural resources in place, shall become property of any State, or international, or intergovernmental or non-governmental organization, national organization or non-governmental entity or of any natural person. This is again the non-appropriation philosophy of Art. II OST and Art. 11(2) of the Moon Agreement. But it explicitly mentions that the resources only when in place, that is untouched in outer space or on celestial bodies, cannot become property of any State or natural person. It explicitly does not make any statement whether or not the removal of these resources is possible. Rather, the end of this paragraph refers again to the international regime to be established according to para. 5 of this Article. Art. 11(4), as has been mentioned in the beginning of our considerations, makes an explicit expression of the freedom of use of outer space and of the celestial bodies.

Now we come to the international regime to be established. Art. 11(5) of the Moon Agreement has not done so. It appeals upon States to do so insofar as it is feasible. And para. 6 underlines that such foreseeable feasibility shall be reported to the UN Secretary-General.

However, in paragraph 7 we find a nucleus of the future international legal order for the exploitation of benefits derived from these resources. The provision anticipates the orderly and safe development of the natural resources, an appeal to sustainable development, a rational management of these resources, which underline the policy of not wasting the resources, and the expansion of opportunities in the use of these resources, which is rather unclear. In its broadness this provision certainly does not give any entitlement to those actors whose opportunities shall be expanded - and finally "an equitable sharing by all States parties in the benefits derived from the resources whereby the interests and needs of developing countries as well as the efforts of contributing States to the exploration of the Moon shall be given special

consideration." Here, we find the only explicit discrimination in that, on the one side, investing States are honored, but on the other side, developing countries shall get a share without presumably having invested. But it is not said what "equitable" exactly means. We can just say that the sharing is not to be understood as an "equal" sharing. It is, thus, relatively open what this international order shall look like. And in this respect it may not be overlooked that too much of such openness might hinder any future investment.

The Future

This openness of Article 11 should be used for making further progress. In the view of the present author, the current situation with its rather unclear wording could be a concrete impediment to any future investment. Therefore, we need a clear international economic order for commercial space activities. Here, the international community has a variety of choices. It can choose the Antarctic approach by making outer space an international common place free from any commercial use at least for the next 30 years, in that, due to ecological needs, no concrete exploitation shall take place. Or it could, like the international legal order for the Deep Seabed, look for some equilibrium between, on the one side, a kind of international administration with the allocation of licenses for presumed users, and the basic freedom of use, on the other side. This all could, of course, be brought under (severe) ecological limitations. It could, finally, also give the international economic order a rather liberal outlook which, in the view of the present author, it also has today. None of the limitations are of such concrete nature that they would limit the basic freedom to use outer space on a commercial basis. If this is wanted, one only explanatory additional paragraph to the Outer Space Treaty respectively the Moon Agreement could be made. This could be made at the second review conference. But a strong plea shall be made here for some action to happen in the foreseeable future, i.e. in the next 5 years.

In concluding, I would like to note that the commercial potential of space activities is only going to increase. All these activities provoke questions concerning the existing legal framework for commercial space activities. This framework will have to equally address both public and private law aspects. It will have to equitably address the division of the commercial benefits

derived from space exploration. It must also provide a rational, reasonable and predicable regulatory framework for private space activities which preserve incentives necessary to stimulate private economic activity while maintaining sufficient control and supervision in keeping with public interest. In the context of the increasing importance of this subject, this initiative by the Indian Journal of International Economic Law is welcome and timely, and makes a very important contribution to the development of this field.

Constructing a Regulatory Regime for the Exploitation of Resources on the Moon and Other Celestial Bodies: A Balancing Act

Jason R. Bonin[1] & Fabio Tronchetti[2]

Abstract

Law can be both a catalyst and consequence of technological change. Nowhere is this fact more clear than in the realm of space law. Man's initial ascent to space was manifested not only through scientific discovery, but also through legal innovation, as both a means of keeping up with and shaping the use of outer space. During the initial period of space exploration, legal norms were developed in a world of state actors, designed to promote the continued peaceful use of space and to prevent claims of dominion or sovereignty. Since that time, further technological development and shifts in economic ideologies have shifted the focus from government-based exploration to private entity-based exploitation, particularly with respect to the moon and other celestial bodies. This article evaluates the legal landscape in outer space. Interested parties maintain three legal positions in relation to the exploitation of extraterrestrial resources located on such bodies. The first holds that we need to revisit space law in order to create the legal certainties required to harness the innovatory capabilities of the private sector, citing the need for real property rights to successfully achieve this end. The second, asserted by an increasing number of "entrepreneurs", claims that space law does not prevent private citizens from claiming ownership of extraterrestrial real estate. While these claims are bogus, attempts at enforcement and a growing belief in their validity may retard the development of legitimate commercial ventures. The third position, principally held by developing states, is

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The authors would like to thank, in both their individual and collective capacities, the Indian Journal of International Economic Law for the invitation to submit this article for publication in the present volume, as well as Professor Haifeng Zhao for his insightful comments on an earlier draft of this article. All errors are, as always, our own.

the benefits derived from extraterrestrial resources should be shared by all, and that a mechanism for the equitable redistribution of such benefits needs to be put in place. The article argues that the current regime is largely adequate to deal with issues of outer space. However, the law is unclear in relation to the level of resource extraction permitted by the Outer Space Treaty. It further argues that, while the issue is not imperative, this situation is undesirable in the long term, and examines past controversies in outer space law to determine an ideal path towards the resolution of the issue.

CONTENTS

I. INTRODUCTION

Law can be both a catalyst and consequence of technological change. This statement is particularly evident in the realm of space law. Over the past sixty years, the possibilities for the exploration and utilization of extraterrestrial resources has transformed from visionary dream to popular reality. Man's initial ascent to space was manifested not only through scientific discovery, but also through legal innovation in the international arena, functioning as both a means of keeping up with and shaping the many use of outer space.

During the initial period of space exploration, legal norms were developed in a world of state actors and were designed to promote its continued peaceful use and to prevent exclusionary acts through claims of dominion or sovereignty.[3] Since that time, further technological development, political change and shifts in economic ideologies have shifted the focus from government-based exploration to private entity-based exploitation. Private actors are competing with government entities in the areas of launch[4] and telecommunications satellite services.[4] Military technologies such as GPS are finding global markets in the private sector. The United States has restructured its legal framework to accommodate commercial space flight,[6] and space tourism has moved beyond the stuff of science fiction into the realm of being technologically, and commercially, possible.[7] While these

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3 *See generally*, G.A. Res. 1962 (XVIII), U.N. Doc. A/5515 (Dec. 13, 1963); G.A. Res. 1721 (XVI), U.N. Doc. A/5026 (Dec. 20, 1961). These principles were codified in the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, Jan. 27, 1967, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty]. Many of the general principles contained in the Outer Space Treaty are seen as customary international law.

4 Commercial Space Launch Act, 49 U.S.C. §§ 2601-2623 (1984). Commercialization has been protected from unfair competition by the United States by three agreements with foreign countries, namely, Russia, China and the Ukraine.

5 *See* 47 U.S.C. § 763 (2000).

6 *See generally*, Commercial Space Launch Amendments Act, 49 U.S.C. § 701 (2004), *construed in* Spencer H. Bromberg, *Public Space Travel – 2005: A Legal Odyssey into the Current Regulatory Environment for United States Space Adventurers Pioneering the Final Frontier* 70 J. AIR L. & COM. 639 (2005).

7 *See* Zhao Yun, *A Legal Regime for Space Tourism: Creating Legal Certainty in Outer Space* 74 J. AIR & SPACE L. 959 (2009).

developments have historically had a geographical base in the United States, commercial space is taking off as a global phenomenon.[8]

One area of interest in the commercial development of space relates to the potential benefits of resource extraction from the surface and subsurface of the moon and other celestial bodies. Celestial bodies are potentially an important source of valuable natural resources. Several lunar missions have demonstrated that the moon is rich in iron, aluminum, oxygen, potassium, hydrogen, manganese and chromium. The moon also contains a substance called Helium-3, which, combined with other materials, can be used as fuel in fusion power reactors. While the facilities necessary to develop a continued presence on the moon has yet to materialize, Japan, China and India all have near-term lunar research programs, with Japan aiming to build a scientific research center on the moon by 2020.[9]

International law prohibits the "national appropriation" of outer space, including the moon and other celestial bodies.[10] It also provides states the right to freely explore and use outer space on a non-discriminatory basis, free access to outer space, the right to freely investigate outer space for scientific purposes, and declares that such exploration and use "shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind".[11] These principles have led to a number of claims. On the one hand, both developed states and private enterprise claim that the lack of legal certainty with respect to extraterrestrial property rights in both land and resources extracted therefrom hinders the development of the technology required to exploit such resources. On the other hand, developing countries hold that the principles declared in Article I of the Outer Space Treaty are binding principles which require the redistribution

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8 *Global Award for Indian Space Agency's Commercial Arm*, SPACE MART (May 18, 2010), http://www.spacemart.com/reports/Global_Award_For_Indian_Space_Agency_Commercial_Arm_999.html.

9 *Japan Draws Plan to Build Research Center on Moon*, MOON DAILY (May 27, 2010), http://www.nasa.gov/vision/universe/solarsystem/hubble_Moon.html.

10 Outer Space Treaty, *supra* note 3, art. II.

11 Outer Space Treaty, *supra* note 3, art. II.

of benefits, derived from exploitative activities, to all nations. Still another set of "entrepreneurs" have claimed actual ownership of the moon and other celestial bodies. Such claims are premised on a common argument that since the Outer Space Treaty prohibits only 'national' claims, private claims are permitted by international law.

This article evaluates the different contentions with respect to resource extraction on the moon and other celestial bodies. Section II addresses the *lex lata* as it relates to property rights in celestial bodies and resources found thereon.[12] While the law is clear as to property rights in land and in fixtures on the land, it is less clear on resources extracted from those bodies. This situation is unsupportable, as an unrestricted right of extraction would create a sub-optimal and potentially unsustainable system of exploitation, while a legal regime unduly restricting exploitative ventures through disincentives to proprietary interests could stymie the technological innovation necessary to develop such activities – positions which are likely to be taken by developed and developing countries respectively. Section III turns briefly from this discussion to address the claims of 'extraterrestrial real estate developers'. It demonstrates them to be false, both in terms of established legal doctrine as well as of conflicts between their claims and the principles of free exploration and use contained in the Outer Space Treaty. Section IV returns to the debate between development and distribution, exploring the need to balance these two positions through a comparison of the failure of the Moon Agreement with the success of the 1988 World Administrative Radio Conference (WARC-ORB-88). Section V draws the article to a close.

II. EXTRATERRESTRIAL PROPERTY RIGHTS IN LAND AND RESOURCES

Despite the number of claims to the contrary, space law already contains a high level of legal certainty in relation to most aspects of property rights. These rights are primarily spelled out within the provisions of the Outer

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12 Indeed, the regime generally follows the Roman law principles related to *res communes*. *See* THE INSTITUTES OF JUSTINIAN 1-2, 5, 18 (J.T. Abdy & Bryan Walker trans. 1876).

Space Treaty.[13] In addition to the rights contained in the *corpus juris spatialis*, the International Telecommunications Union (ITU) developed a property right of sorts relating to the use of the limited number of orbital slots and frequencies within the geostationary orbit, or GSO,[14] and the inter-governmental agreement on the International Space Station contains some provisions on the ownership of intellectual property rights for objects developed in space.[15]

Of the rights mentioned above, our concern is with the principles delineated in the Outer Space Treaty, and particularly in relation to three classes of objects. Those objects are extraterrestrial property rights in land, property rights in objects affixed to the moon or other celestial bodies and resources extracted from such bodies. This section examines each in turn to determine the law applicable to the individual parts.

A. The Non-Appropriation Principle and Claims to Rights in Land

Article II of the Outer Space Treaty provides that, "[o]uter space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means".[16] This principle, referred to as "the non-appropriation principle",

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13 *Id.* In addition, the Moon Agreement attempted to introduce additional principles to the legal framework, such as those related to the need to maintain the environmental integrity of the celestial body explored or exploited and the principle that the Moon and its natural resources were the "common heritage of mankind". These rules were never accepted by the majority of states, and as a result the Agreement has received an extremely low number of ratifications. *See* Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, arts. 7, 11, Dec. 18, 1979, 1363 U.N.T.S. 3 [hereinafter Moon Agreement] (As of 2005, there are only 16 signatures and 11 ratifications. Of the space-faring nations, only France and India have signed the Agreement, and both have failed to ratify it.). *See also* Henry R. Hertzfeld & Frans von der Dunk, *Bringing Space Law into the Commercial World: Property Rights without Sovereignty* 6 CHI. J. INT'L L. 81, 85 (2005).

14 Hertzfeld & von der Dunk, *supra* note 13, at 83.

15 Agreement among the Government of Canada, Governments of the Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation, and the Government of the United States of America Concerning Cooperation on the Civil International Space Station ,art. 21, Jan. 29, 1998, T.I.A.S. 12927. *See also* Hertzfeld & von der Dunk, *supra* note 13, at 83-84 (citing, in addition to the inter-governmental agreement, a NASA directive on IP developed on the ISS).

16 Outer Space Treaty, *supra* note 3, art. II. For an analysis of Article II of the Outer Space Treaty, *see* S. Gorove, *Interpreting Article II of the Outer Space Treaty*, PROC. ELEVENTH COLLOQUIUM ON L. OUTER SPACE 40 (1968); L. Tennen, *Article II of the Outer Space Treaty, the Status of the Moon and Resulting Issues*, PROC. FORTY-SEVENTH COLLOQUIUM ON L. OUTER SPACE 520 (2004).

was a watershed in international law. With this, the parties to the Treaty effectively and emphatically ended claims of outer space being *terra nullius*.[17] With relation to states, the possibility to claim sovereignty over this final frontier effectively ended with the non-appropriation principle becoming customary international law.

With respect to states, Article II draws a distinction between the concepts of *imperium* and *dominion*, a distinction drawn by natural law, as carried over from Roman law. Vattel noted that the relationship between the state and the territory it governed consisted of two elements. The first element consisted of the domain, a specified area of land which the state owned and the benefits of which could be derived exclusively by the state.[18] The second element was that of empire, or the sovereign command.[19] By including use, occupation or "any other means" within the scope of its provisions, Article II explicitly extends beyond claims of sovereign command to situations of *de facto* control of property without the assertion of sovereign jurisdiction.[20]

Apologists for a private right of appropriation base their arguments on the definition of the term "national". They argue that while sovereign rights are excluded from outer space by the non-appropriation principle, private rights of ownership remain undisturbed. This argument ultimately turns on a theory of property rights as antecedent and qualitatively superior to sovereignty, creating a conflict ultimately rooted in the debate between the jurisprudence of natural law – and particularly arguments based on the political theory of John Locke – and positive law.[21] While the philosophical contentions

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17 *See* GEORG SCHWARZENBERGER & E.D. BROWN, A MANUAL OF INTERNATIONAL LAW 93(6th ed. 1976). The authors note that, while the UNGA resolutions preceding the Outer Space Treaty prohibited sovereign appropriation under international law, as General Assembly resolutions they were only arguably binding upon the parties. With both space powers parties to Outer Space Treaty, any argument that outer space could be appropriated by states was effectively shattered.

18 *See* EMMERICH DE VATTEL, THE LAW OF NATIONS BOOK I § 204 (1758); MALCOLM SHAW, TITLE TO TERRITORY IN AFRICA: INTERNATIONAL LEGAL ISSUES 12 (1986).

19 *Id.*

20 Article II thus provides for the contentious issues relating to *res communia* identified by Shaw. *See* SHAW, *supra* note 18. ("Whether [the distinction between property and sovereignty] could be used to solve problems relating to the use of *res communia*, such as the sea-bed, is more doubtful.")

21 *See* Kurt Anderson Baca, *Property Rights in Outer Space* 58 J. AIR L. & COM. 1041 (1992-93).

underlying this debate extend far beyond the scope of this article, it is worth noting some of the problems related to such an interpretation. This article will briefly outline three significant hurdles to such a jurisprudential argument, two based in the terms of the Outer Space Treaty itself, and one grounded in natural legal theory.

The first problem relates directly to the interpretation of the term 'national' as used within the treaty. In addition to Article II, the term 'national' as a descriptor appears in relation to states' responsibility for its "national activities" in outer space.[22] That provision, contained in the first sentence of Article VI of the Treaty, provides, in relevant part:

> States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the Moon and other celestial bodies, *whether such activities are carried on by governmental agencies or by non-governmental entities*, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty.[23] (emphasis added)

The interpretation of treaties requires that the terms of the treaty be read in the context of the agreement. Context is set by an interpretation not of each provision on a stand-alone basis, but in the context of the treaty as a whole.[24] Thus, absent a specific reason to the contrary, one would expect the term 'national' to maintain the same meaning as to the classes of activities, e.g. governmental and non-governmental, which it covers. Approached from a different perspective, one would similarly expect that the scope of national

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22 *See* Outer Space Treaty, *supra* note 3, art. VI, art. IX. Article IX refers to "nationals" as parties outside of the governmental structure ("If a State Party to the Treaty has reason to believe that an activity or experiment planned by it or its nationals in outer space, including the Moon and other celestial bodies, would cause potentially harmful interference with activities of other States Parties in the peaceful exploration and use of outer space, including the Moon and other celestial bodies, it shall undertake appropriate international consultations before proceeding with any such activity or experiment.").

23 Outer Space Treaty, *supra* note 3, art. VI. Article VI goes on to require the "appropriate state" to both authorize and continuously supervise the activities of non-governmental entities, and further provides that in the case of space activities conducted by international organizations the member states of that organization will share the responsibilities ascribed by the Treaty.

24 International Law Commission, *Draft Articles on the Law of Treaties with commentaries* 2 Y.B. INT'L L. COMMISSION 187, 221 (1966) (citing *Competence of the ILO to Regulate Agricultural Labour, P.C.I.J.* (1922), Series B, Nos. 2 and 3, p . 23).

appropriation would include the types of actions included within the broader term of national activities, since appropriation can be classified as a particular subclass of action falling within the umbrella of a wider class of actions i.e. 'activities'.

A second issue relates to the concept of 'mankind' as a class of legal subject and, in the particular context of outer space law, what is meant by "[t]he exploration and use of outer space, including the Moon and other celestial bodies, … shall be the province of all mankind".[25] This tree bears fruit in the form of two questions. The first such question is whether the idea of the "province of mankind" was intended merely as a political exhortation of ideals or reflects the intention to form a truly new category of law.[26] There was indeed a drive in the 1960s towards exploring a "law of mankind", brought out by a collective concern to prevent a declaration of war in an era of mutually assured destruction.[27] A corollary to the first question and one much more difficult to answer is whether, if mankind as a collective unit was intended to become a subject of international law, such extension was in fact created. The developed world's, and particularly the United States's, rejection of the "common heritage of mankind" principle brought much of the collective impetus developed throughout the 1960s to a close. Yet the rejection of the "common heritage" principle has much to do with the particular rules on the distribution of the benefits of exploitative activities, and not with a conceptual disagreement with mankind as a whole as an object of international law.

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25 Outer Space Treaty, *supra* note 3, art. I. *See* Ernst Fasan, *The Meaning of the Term "Mankind" in Space Legal Language* 2(2) J. SPACE L. 125 (1974). Beyond the scope of space law, *see generally* Harry W. Jones, *Law and the Idea of Mankind* 62(5) COLUM. L. REV. 753 (1962). *But see* Adrian Bueckling, *The Strategy of Semantics and the "Mankind Provisions" of the Space Treaty* 7 J. SPACE L. 15 (1979).

26 *See* Fasan, *id.*

27 *See* Fasan, *supra* note 25, at 127-30 (surveying the works of Zhukov, Jenks, Gal, Cocca Gorove and Lachs); Jones, *supra* note 25. One of the strongest proponents of the "law of mankind" movement was Aldo Armando Cocca: *see* Aldo A. Cocca, *The Supreme Interests of Mankind vis-à-vis the Emergence of Direct Broadcast* 2 J. SPACE L. 83, 83 (1974) ("In the present state of interdependence of peoples, all national activities extending beyond the frontiers of the country of origin must be limited and conditioned according to law. The international community is steadily progressing in the elaboration of a more perfect law of mankind, independently from the law of States individually considered. Those areas of specialization which are most developed at the moment, such as human rights, atomic energy law, the law of the sea-bed and ocean floor, the protection of the environment and, particularly, the law of outer space, are contributing toward this new expression of man in society and in the planetary dimension.")

A second question relates to the scope of the provision. Article I refers to the "exploration and use" of outer space as being the province of mankind, and not to outer space itself. Proponents of private property rights in extraterrestrial land claim that this provision does not prohibit private claims to land, so long as access to outer space, including celestial bodies, remains open to exploration and use by states. While there is no explicit denial of claims to private property contained within the Article, some practical problems with such an interpretation remain. Most importantly, the free exploration and use of outer space accorded to states by Article I create a fundamental conflict with the right of exclusive use associated with private property. While not addressed in the actual case, the case of *Nemitz v. United States*[28] illustrates the potential conflict between the freedom of exploration and use granted in the Outer Space Treaty with the incentives derived from the exclusive use of private property.[29]

A third issue relates to the context of private property rights within the context of natural legal theory itself. Within that theory, the idea of the creation of private property rights refers to the development of social relationships pre-existing the formation of the political association of the state.[30] Jurists, however, are not of one opinion where the state exists, even within the natural law tradition. Vattel's own opinion shows that once a state has been formed, the cumulative domain of the individuals comprising the state equals the domain of the state itself:

> Even the property of the individuals is, in the aggregate, to be considered as the property of the nation, with respect to other states. It, in some sort, really belongs to her, from the right she has over the property of her citizens, because it constitutes a part of the sum total of her riches, and augments her power.[31]

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28 2004 WL 3167042 (D. Nev. 2004).

29 *See infra*, Part III.B.

30 HENRY SUMNER MAINE, ANCIENT LAW 243-48 (reprinted in Classics of Anthropology series, Ashley Montagu ed. 1986) (referencing, *inter alia*, the English jurist William Blackstone and German jurist Friedrich Carl von Savigny).

31 EMMERICH DE VATTEL, THE LAW OF NATIONS BOOK II § 81 (1758). In the case of the modern corporation, whose very existence relies on a legal fiction of the state, would fall within the category of persons within the state.

Additionally, Vattel draws a distinction between the 'high domain', which is the country over which the state extends its sovereignty, and the 'useful domain', corresponding with the rights belonging to the individuals in the state.[32] The latter can be separated from sovereignty and may exist in other jurisdictions, in which case they are possessed as private individuals.[33] Vattel's position largely supports extending Article II of the Outer Space Treaty to the acts of private individuals.

B. Objects Affixed to the Moon or Other Celestial Bodies

Whereas Article II removes the possibility of states to claim either *dominium* or *imperium* over outer space, including any celestial bodies contained therein, the state of registry explicitly retains jurisdiction and control over space objects launched into outer space, including the personnel onboard, and irrespective of whether the object is in outer space or on a celestial body such as the moon.[34] Moreover, Article VIII recognizes that persons retain the rights of ownership in the objects launched into space, including those landed or constructed on a celestial body.[35]

While some commentators have noted an inherent conflict between the provisions of Articles II and VIII of the Outer Space Treaty,[36] the tension between the two provisions is one of general scope and not specific to space law. Indeed, such tension exists within any space of open-access where the ability to control the actors within that space remains fragmented. In this regard, the key element functionally differentiating space law from the law relating to vessels operating on the high seas is the removal of the territorial element from the command-control function in space law.

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32 *Id.*, § 83.

33 VATTEL, *supra* note 31, at § 83.

34 Outer Space Treaty, *supra* note 3, art. VIII.

35 Outer Space Treaty, *supra* note 3, art. VIII. Hertzfeld and von der Dunk have noted that there are "no clear rules" as to objects made in outer space and constructed entirely of extraterrestrial materials: *see* Hertzfeld & von der Dunk, *supra* note 13, at 83 ("With regard to any structure essentially made from locally available resources, there are no clear rules, and it may be valuable to establish clarity on this subject.")

36 *See* David Goldman, *Settlement and Sovereignty in Outer Space* 22 U. W. ONTARIO L. REV. 155, 159-60 (1984); Baca, *supra* note 21, at 1066-67.

C. The Exploitation of Resources on the Moon and Other Celestial Bodies

Of the rights and obligations with respect to property rights in outer space, the most unclear remains the extent to which states can exploit the natural resources found on the surface of celestial bodies.[37] Most commentators agree that some right of exploitation exists. There is also limited practice confirming this, as both the United States and the Soviet Union have removed samples from the lunar surface and brought them to earth. In each of these circumstances, no state voiced any opposition to either state's conduct.[38]

However, there is some uncertainty as to the extent of the right to extract natural resources from those bodies. This degree of uncertainty is sometimes reflected directly in commentators' own vacillation between an unfettered right to exploit and the uncertainty created by unclear legal provisions. The following comment notes both an unconditional right to extract resources from celestial bodies and a chilling effect resulting from uncertainty in the legal regime:

> Anything taken from space and returned to the earth becomes the property of the person, company, or government that performs the action, given the absence of United Nations treaty provisions prohibiting such ownership. Added legal certainty may eventually become necessary to prevent the undue stifling of relevant private interests, especially with regard to minerals and other potentially valuable resources that could be mined from celestial bodies. But as nations become increasingly aware of the possibility of inflicting environmental damage on celestial bodies, most will likely limit any government or private activity that might endanger lunar or other celestial environments.[39]

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37 *See* Hertzfeld & von der Dunk, *supra* note 13, at 82-86. Also noting the lack of international law on intellectual property rights developed in outer space, Hertzfeld & von der Dunk, *supra* note 13, at 83-84.

38 *See* Alan Wasser & Douglas Jobes, *Space Settlements, Property Rights, and International Law: Could a Lunar Settlement Claim the Lunar Real Estate It Needs to Survive?* 73 J. AIR L. & COM. 37, 63 (2008).

39 Hertzfeld & von der Dunk, *supra* note 13, at 83.

The passage above implies at least two questions. The first is whether a regime that permits the removal of 'anything' from space really permits an unqualified removal of 'everything' from a particular celestial body. The fact that 'anything' might be less than 'everything' is suggested in a later passage in the same article:

> Property rights exist in space, even without ownership or territorial rights to celestial bodies, although their applicability to resource extraction remains a contentious issue. Exactly what those rights are and how far they may apply to the extraction of resources is still under debate, creating uncertainty for a company looking to invest in such ventures.[40]

That we are asking the question 'if' presupposes that we have not determined the boundary.

The comment also raises a second question relating to the management of exploitative space activities and their potential negative impact on the outer space environment. Again, at least two scenarios exist, and are inevitably linked to the resolution of the first issue. Where space law is interpreted as creating an unlimited right of extraction, the legal regime is thus one of unrestricted open access. This scenario is one described by Garrett Hardin in his famous essay "The Tragedy of the Commons".[41] "Freedom in a commons", Hardin declared, "brings ruin to all."[42] According to Hardin, a commons scenario incentivizes the overuse of a finite resource open to exploitation, which ultimately results in the destruction of the resource used. Hardin illustrated this scenario by imagining a public grazing pasture of finite dimensions which was open to a number of herdsmen. Once the pasture reached its collective capacity, the addition of any new grazing animal would generate a positive and negative utility. Whereas the positive utility would be one and internalized by the individual who increased the size of his herd, the negative utility would be distributed throughout the community so that the portion of the negative utility actually internalized would be less than one.[43] The result was a scenario

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40 Hertzfeld & von der Dunk, *supra* note 13, at 86.

41 Garrett Hardin, *The Tragedy of the Commons* 162 SCIENCE 1243 (1968).

42 *Id.*

43 Hardin, *supra* note 41, at 1244.

whereby the nature of the incentives and disincentives would lead to the overuse and degradation of the resource while minimizing technological innovation to improve productivity. Similarly, a failure to wholly internalize the negative utility presents similar issues even in a second scenario of less-than-complete open access.

Hardin's argument is not without its criticisms. He fails, for example, to account for the possibility that self-regulation could positively constrain the use of a commons. Nevertheless, he presents a powerful argument against an unregulated commons scenario, whether the resource in question is pastureland or the moon. In order to control for the problems associated with an open-access regime, any legal architecture which contemplates the efficient, continued and sustainable exploitation of extraterrestrial resources should confine the impact of the negative utility to the individual who receives the positive utility.

III. EXTRATERRESTRIAL REAL ESTATE: CURRENT CLAIMS AND POTENTIAL ISSUES

"Nothing could be better than to own your own crater".[44] So declares the website of a company called Lunar Registry, which, together with another undertaking named Lunar Republic Society, offers its clients the possibility to buy "your own acre of Moon property, complete with an elegantly engraved and personalized parchment deed certificate" and with full mineral rights over the acquired piece of lunar soil.[45] Nor is Lunar Registry the first, nor the most famous, of a growing number of claims of private ownership of various celestial bodies. A brief browse through the internet is sufficient to identify several websites offering the possibility of purchasing extraterrestrial 'real estate', whether it is on the moon or on the surface of any other planet of our solar system.

While the activities of these 'entrepreneurs', in and of themselves, may be considered little more than a joke, the proliferation of such claims

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44 *Lunar Registry: The International Lunar Lands Registry* (June 1, 2010), http://www.lunarregistry.com/index.html.

45 *Id.*

accompanied by the public perception that such claims are valid can pose a serious threat to the development of commercial space.[46] This section addresses three aspects of extraterrestrial real estate. First, it places the development and scope of such claims in historical context through a non-exhaustive survey of claims to celestial bodies. Second, it discusses the misinterpretation of law and the misallocation of resources that these claims may lead to, if pursued. Third, it highlights actual developments to demonstrate the incompatibility of private property claims with the principles contained in the *corpus juris spatialis*.

A. A BRIEF HISTORY OF PRIVATE CLAIMS TO EXTRATERRESTRIAL REAL ESTATE

While claims to extraterrestrial real estate proliferated simultaneously with the development of space technology, claims to lunar title date back to 15 July 1756, when the Prussian emperor Frederick the Great gifted the moon to a man named Aul Juergens.[47] In doing so, the Prussian emperor also established a line of inheritance – today, this claim is held by Martin Juergens.[48]

It took nearly 200 years for a new claim to arise. In 1955, Robert R. Coles, a former chairman of New York's Hayden Planetarium, claimed ownership of the Moon.[49] In 1962, before the launch of the first lunar probe of the United States, Ranger 3, an individual residing in one of the British dominions sent a telegram to President Eisenhower notifying him that he

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46 *See* Hertzfeld & von der Dunk, *supra* note 13, at 82, 91-92 (noting that "[t]he most threatening current problem surrounding the issue of real property rights in space is in actuality not related to space entrepreneurship. It instead arises from shortsighted greed premised on misinterpretations of treaties and other applicable laws. For example, several companies have been selling land on the Moon and issuing "deeds" to that land, behavior which unequivocally violates space law treaties. If the public perceives that this action is legal, as evidenced by the lack of government willingness in putting a halt to these activities, serious harm could result in the future." *Id.* at 83.).

47 Virgiliu Pop, *The Men Who Sold the Moon: Science Fiction or Legal Nonsense?* 17 SPACE POL'Y 195 (2001).

48 *See id.*; Gyula Gal, *Acquisition of Property in the Legal Regime of Celestial Bodies*, PROC. THIRTY-NINTH COLLOQUIUM ON L. OUTER SPACE 45 (1996). According to Juergens, his title lies somewhere in the German Bundesarchiv. He has also filed a cease-and-desist letter with lunar proprietor Dennis Hope. D. Trull, *The Moon Is Mine*, http://www.parascope.com/articles/1196/Moonw.htm.

49 This event is described by Pop. *See* Virgiliu Pop, *Lunar Real Estate: Buyer, Beware!* http://www.spacefuture.com/archive/lunar_real_estate_buyer_beware.shtml.

had filed a claim to a certain lunar area and that he would consider the United States responsible for any damage the probe may cause to his property.[50] In one of the more creative claims, in 1969, shortly after the success of Apollo 11, a man was arrested in Brazil for selling parts of the lunar soil at a price of $25 each. The defendant rested his defense on the argument that he had sold parcels of the moon to Buzz Aldrin and Lance Armstrong, the two astronauts having gone to the moon to inspect their newly acquired property.[51] The following year a company called Celestial Gardens sold lunar plots indentified on the basis of a United States military map.[52] Further exploration has yielded more audacious claims. In 1992, a company known as Space Pioneers declared that it owned all the planets in the Milky Way, and sold deeds to one-acre parcels on Mars at the price of US$ 29.95 per acre.[53]

The most famous "extraterrestrial real estate" company appears to be Lunar Embassy, founded in 1980 by the American entrepreneur Dennis Hope.[54] While relatively unsuccessful at first, his business received much attention during the new media boom of late 1990's and early 2000's. According to the Lunar Embassy website, thousands of thousands of customers have already bought plots of the moon.[55] As a consequence of this success, Lunar Embassy expanded its range of activities. It started appointing local representatives outside the United States, calling them 'ambassadors' and selling extraterrestrial real estate on other celestial bodies, leading to further commercial success and the occasional courtroom drama. In 2004, Canada jailed the Lunar Embassy ambassador Lisa Fulkerson, accusing her of fraud

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50 *Id. See also* G.D. Schrader, *National sovereignty in space*, PROC. FIFTH COLLOQUIUM ON L. OUTER SPACE 42 (1962). This issue has had no further development, maybe because Ranger 3 failed to reach the lunar surface.

51 According to the salesmen, the Apollo 11 mission was conceived as a means of inspecting Neil Armstrong and Buzz Aldrin's own claims to the Moon purchased from the individual. *See* Pop, *supra* note 47, at 196 (citing David L., *Seller of Fake Moon Rock May Get Prison* (Nov. 2, 2000), http://www.space.com/news/Moon-rock_guilt_001102.html).

52 *Id.*

53 Pop, *supra* note 49.

54 For information on Lunar Embassy, see *Lunar Embassy World Headquarters*, http://www.lunarembassy.com.

55 *Id.*

and theft.[56] In 2005, the business license of the Lunar Embassy in China was suspended and the company fined CNY 50,000 on grounds of speculation, fraud and profiteering.[57] This latter case represents the first occasion in which a national court has declared the activities of extraterrestrial real estate companies illegal.

Lunar proprietors, however, are not only defendants in the courtroom. Claims that national space agencies have infringed on private owners' property rights have also emerged in both national and international contexts. In July 1997, Adam Ismail, Mustafa Khalil and Abdullah al-Umari filed a lawsuit in San'a, Yemen against the National Aeronautics and Space Administration (NASA) requesting the immediate cessation of all Pathfinder operations on Mars pending a verdict of the court.[58] These three individuals argued that Mars belonged to their families for 3000 years and that NASA, by not informing them or asking their permission to carry out its operations, had inadvertently trespassed on their property.[59] The applicants withdrew the case when the Yemeni Prosecutor General threatened them with arrest – only to reappear the next year selling Martian real estate at $2 a square meter.[60]

A second claim against NASA emerged in the form of a federal civil suit in *Nemitz v. United States*,[61] brought by American citizen Gregory Nemitz against both NASA and the United States Department of State for trespassing

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56 *Buy me to the Moon: Earthlings selling lunar landscape*, USA TODAY (Mar. 28, 2004), http://www.usatoday.com/tech/news/2004-03-28-lunar-sales_x.htm (also documenting the interesting case of Rene Veenema, a Dutch national who falsely claimed to sell Lunar Embassy property in the Netherlands); Luna Society International, *Luna Society International: The Official Website of the Moon*, http://www.moon.com.co/; *Buy Me to the Moon: Make Millions Selling Lunar Landscape*, http://www.redorbit.com/news/space/48205/buy_me_to_the_Moon_make_millions_selling_lunar_landscape/index.html.

57 *See Beijing authorities suspend license of "Lunar Embassy"*, CHINA DAILY (May 11, 2005), http://www.chinadaily.com.cn/english/doc/2005-11/07/content_492152.htm.

58 For a description of this case, *see* W. White, *Interpreting Article II of the Outer Space Treaty*, PROC. FORTY-SIXTH COLLOQUIUM ON L. OUTER SPACE 339 (2003). *See also* Pop, *supra* note 47, at 197.

59 Pop, *supra* note 47, at 197

60 Pop, *supra* note 47, at 197. For an enjoyable article on their entrepreneurial efforts, *see also* Barbara Plett, *Despatches: Yemenis Claim Mars*, BBC NEWS (Mar. 22, 1998), http://news.bbc.co.uk/2/hi/despatches/67814.stm (also noting source of claim derived from Himyaritic and Sabaean mythologies).

61 2004 WL 3167042 (D. Nev. 2004).

on the asteroid Eros.[62] In the suit, Mr. Nemitz requested NASA pay a parking fee for landing the NEAR spacecraft on the asteroid, which he had purchased and registered with a private "space registry" called Archimedes Institute. In April 2004, the District Court of Nevada dismissed Mr. Nemitz's claim for failure to state a cause of action, stating in part that, "neither the failure to the United States to ratify the [Moon Agreement], nor the United States'[s] ratification in 1967 of the [Outer Space Treaty], created any rights in Nemitz to appropriate private property rights on asteroids".[63] The United States Court of Appeals for the Ninth Circuit affirmed the decision of the District Court.[64]

The *Nemitz* case is also useful because it introduces a further element into our discussion – the creation of international registries for extraterrestrial proprietary claims.[65] The difference with other undertakings consists in the fact that these companies do not claim ownership of celestial bodies. Rather, their activities act as a means of recognizing the claims of those individuals claiming extraterrestrial property rights. In other words, they claim to solve the quite separate issue of allocating property rights.

B. Problems of Misinterpretation and Misallocation

Extraterrestrial real estate developers are well aware of the Outer Space Treaty and of the non-appropriation principle contained in Article II.[66] They

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62 For information on the *Nemitz* case see: W. White, *Nemitz vs. US, the First Real Property Case in United States Courts*, PROC. FORTY-SEVENTH COLLOQUIUM ON L. OF OUTER SPACE 339 (2004).

63 *Nemitz v. United States*, Order CV-N-03-0599-HDM (U.S.D.C., Nevada, 27 April 2004), http://www.erosproject.com/order01.html. Interestingly, while NASA explicitly avoided interpreting article II of the Outer Space Treaty, a letter by the Department of State's Bureau of Oceans and International Environmental and Scientific Affairs interpreted article II of the Outer Space Treaty as denying private claims to extraterrestrial real property ("We have reviewed the 'notice' dated February 13, 2003, that you sent to the US Department of State. In the view of the Department, private ownership of an asteroid is precluded by Article II of the Outer Space Treaty of 1967. Accordingly, we have concluded that your claim is without legal basis.").

64 The text of the decision is here repeated in full, taken from http://www.erosproject.com/appeal/apindex.html.:

> Gregory Nemitz appeals pro se from the district court's dismissal of his complaint for failure to state a claim in his action seeking a declaratory judgment concerning alleged private property on the asteroid 433, "EROS." We affirm for the reasons stated by the district court in its order dismissing the complaint, filed on April 26, 2004. (1)
>
> Footnote (1): Nemitz's pending motions to convene an Article III court and to file an amicus brief are denied.

65 *See Lunar Federation company*, http://lunarfederation.com/faq.htm (link now broken). For information on the Archimedes Institute, see *The Archimedes Institute*, http://www.permanent.com/ep-archi.htm.

66 *Supra* note 15.

have also developed a legal argument as to why their claims are valid, interpreting Article II as non-applicable to questions of private appropriation.[67] Lunar Embassy, for example, provides the following (questionable) legal reasoning behind its claim to own the Moon:

> [Acquiring title to extraterritorial property is] a bit like in the old west: Who stakes their claim on a piece of land first, gets the best property. This is modeled on old american [*sic*] law. Such a claim must be registered with your local Government Office for claim registries. In regard to Lunar properties, it obviously helps, if this is also done in the USA, as the Americans were the first to walk on the Moon and plant their flag on it (ie [*sic*] it could be argued, that if the Moon ever belonged to anyone, it certainly belongs more to the USA than any other nation).[68]

Hope's claims to lunar property rest on three arguments. The first argument is that lunar property is akin to *terra nullius*, and is thus free for the taking. The second argument is that registering his property with a United States agency protects his claims because the United States was the first country to land on the moon and thus, it 'belongs' to the United States. The third is that by notifying the United States government and the United Nations of his claim and having received no response, he had received the tacit approval of the authorities over his ownership of the moon.

Quite outside of the general discussion on the possibility of private ownership, it is quite easy to see the fallacy in his argumentation.[69] The second claim proves easiest to invalidate, as it follows that the United States has appropriated the Moon, an act expressly prohibited in Article II of the Outer Space Treaty.[70] Likewise, the third claim is wholly unavailing, as silence does not entail acquiescence. This leaves only the first claim, that outer space is in fact something akin to *terra nullius*. However, Hope's contentions fail

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67 *See supra*, s. II.A.

68 *See supra* note 52. Using Hope's own expression of the norms and procedure of claiming lunar territory proves useful for two reasons. First, Hope's claims demonstrate in very concrete terms the fallacies underlying current claims to extraterrestrial property. Second, they provide a firm foundation of understanding the confusion underlying interpretation of Article II.

69 For the latter, *see supra*, s. II.A.

70 Outer Space Treaty, *supra* note 3 and accompanying text.

to meet the requirements to satisfy such claims, whether in civil or international law. The requirement that a claimant actually make effective use of the property claimed has a long tradition, going back to principles of *occupatio* under Roman law.[71] In public international law, the requirement was institutionalized by requiring the claimant state to possess and administrate the affairs of the acquired territory, in what became the principle of first discovery and effective occupation.[72] In the *Island of Palmas* decision, the International Court of Justice translated this into the principle of first discovery and effective occupation.[73] In the case of the American frontier, acts designed to push frontier settlement by recognizing claims to frontier land, such as the Homestead Act, required not only a claim, but actual "settlement and cultivation".[74]

Developments in the area of extraterrestrial real estate also illustrate issues of concern in the realm of allocation and exclusion. In this respect, the *Nemitz* case is quite interesting. To be effective, a system of property rights requires not only the recognition of the capacity to hold such right, but also the ability to allocate those rights to particular individuals and to exclude other individuals from the property once allocated.[75] That no recognized regulatory mechanism exists to collect, examine and recognize potential claims to lunar property presents extreme problems in sustaining a viable property rights

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71 HENRY SUMNER MAINE, ANCIENT LAW 239 (Ashley Montagu, ed., University of Arizona Press 1986) (1861) ("The Roman principle of Occupancy, and the rules into which the jurisconsults expanded it, are the *source of all modern International Law on the subject of … the acquisition of sovereign rights in newly discovered countries.* They have also *supplied a theory of the Origin of Property*, which is as once the popular theory, and the theory which, in one form or another, is acquiesced in by the great majority of speculative jurists." [emphasis added]). In the sphere of property rights, the Roman law principle of occupation was used as a means of explaining the transformation from the state of nature to a system of property rights, a theory expressed by jurists of both the common law and civil law traditions. *Id.* at 243-48 (referencing, *inter alia*, the English jurist William Blackstone and German jurist Friedrich Carl von Savigny). *See also* SURYA P. SHARMA, TERRITORIAL ACQUISITION, DISPUTES AND INTERNATIONAL LAW 61 (1997).

72 Oppenheim succinctly summarized these requirements in his treatise on international law in the following words: "Possession (by settlement) and administration are the two essential facts that constitute an effective occupation." LASSA F.L. OPPENHEIM, INTERNATIONAL LAW: A TREATISE 555 (8th ed. 1955). *See also* SCHWARZENBERGER & BROWN, *supra* note 15, at 97 & 563.

73 *See e.g.* Island of Palmas Case, 2 U.N. Rep. Intl. Arb. Awards 829 .

74 *See e.g.* Homestead Act of 1862 (adopted during the 37th congress, session II, ch. LXXV, 1862).

75 Baca, *supra* note 21.

regime. Nemitz could not assert his claim against the United States not only because the registry maintained by the Archimedes Institute does not crystallize his rights to Eros, but also because an appropriate alternative mechanism does not exist.

The *Nemitz* case also clearly demonstrates the conflict between the exclusionary nature of private property rights and the freedom of states to explore outer space. The latter right is explicitly conveyed within the terms of Article I of the Outer Space Treaty, which grants states free access to outer space, the right to freely explore and use outer space on a non-discriminatory basis and the right to freely investigate outer space for scientific purposes.[76] Such rights also explicitly include the moon and other celestial bodies.[77] State access, however, weakens the incentives provided by a private property rights regime. While neither the government agency nor the court looked to Article I to justify its decision, either could have asserted the positive right of the United States to access and investigate the Eros asteroid for scientific purposes.

Nemitz also demonstrates a problem wholly different from legal uncertainty but no less serious – what we might call behavioral uncertainty. Behavioral uncertainty refers to the perceived position of various actors and how those perceptions influence their actions with respect to other actors. As *Nemitz* demonstrates, those who believe their claims to be valid might well act on them. Such actions can have a negative influence on business decisions quite independent of legal uncertainties.[78]

IV. BETWEEN OWNERSHIP INCENTIVES AND DISTRIBUTIONAL EQUITY: STRIKING THE BALANCE

Up to this point, this article has addressed certain normative aspects of the legal regime governing the exploitation of the moon and other celestial bodies, and has demonstrated how current claims of extraterrestrial 'real estate developers' both operate on misinterpretations of the law and present potential conflicts between a private system of property rights and the current legal

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76 Outer Space Treaty, *supra* note 3, art. I.

77 Outer Space Treaty, *supra* note 3, art. I.

78 Hertzfeld & von der Dunk, *supra* note 13, at 92.

regime governing outer space.[79] We have also discussed certain uncertainties and inefficiencies in the current regime as well as their potential effects on any space activities aimed at exploiting the resources contained on or in the moon or other celestial bodies.[80]

Ultimately, the resolution of these uncertainties and inefficiencies is tied to the distribution of the benefits received from exploiting those resources. This question has proven to be extremely difficult. In the area of space law, the debate over a regulatory framework for resources on celestial bodies has centered on this pivot between incentivizing research and development through private ownership and the need to provide for some form of redistribution between the few with technological resources to exploit those resources and the many who do not. This tension is best exemplified in both the failure of the Moon Agreement to garner any substantive form of support and the success of the ITU in creating a system to manage the GSO.

A. The Moon Agreement and WARC-ORB-88: A Common Tale with Divergent Endings

The Moon Agreement provides for the development of a regulatory framework for the exploitation of lunar resources. More specifically, Article 11(5) provides that, "States Parties to this Agreement hereby undertake to establish an international regime, including appropriate procedures, to govern the exploitation of the natural resources of the Moon as such exploitation is about to become feasible".[81] The regulatory framework to be established in accordance with the Agreement is to be based on the principle

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79 *See generally supra*, s. III.

80 *See generally supra*, s. II.

81 Moon Agreement, *supra* note 13, art. 11(5). The Moon Agreement treats resources in place differently than those once extracted. Moon Agreement, *supra* note 13, art. 11(3) ("Neither the surface nor the subsurface of the Moon, nor any part thereof or natural resources *in place*, shall become property of any State, international intergovernmental or non-governmental organization, national organization or non-governmental entity or of any natural person. The placement of personnel, space vehicles, equipment, facilities, stations and installations on or below the surface of the Moon, including structures connected with its surface or subsurface, shall not create a right of ownership over the surface or the subsurface of the Moon or any areas thereof. The foregoing provisions are without prejudice to the international regime referred to in paragraph 5 of this article." [emphasis added]).

of the "common heritage of mankind".[82] Unlike the province of all mankind, the concept of common heritage of mankind has proven to be extremely controversial, calling for the recognition of a common propriety interest in a particular landscape.

The logical conclusion of such expression is found in Article 11(7)(d), requiring the equitable distribution of the benefits of exploitation amongst all nations:

> The main purposes of the international regime to be established shall include … [a]n equitable sharing by all States Parties in the benefits derived from those resources, whereby the interests and needs of the developing countries, as well as the efforts of those countries which have contributed either directly or indirectly to the exploration of the Moon, shall be given special consideration.[83]

This provision primarily represents the interests of the developing world in ensuring their ability to access such benefits, given the current technological lag. The rejection of this form of redistribution by the technological 'haves', most notably the United States, is cited as the principle reason for the failure of the Moon Agreement to develop any significant following.[84]

So far, the most developed regulatory system for a scarce resource in outer space is the regulation of space and frequency allocations in the GSO by the ITU, first agreed upon in WARC-ORB-88. The GSO refers to a particular orbit located 35.757 kilometers above the equator. In this particular location, satellites rotate around the earth in 23 hour 56 minutes and 4 seconds, a period which is synchronous with the earth's rotation on its axis, a feature which fixes the object relative to a particular point on the earth's surface. A satellite placed in the GSO can continuously cover a particular area measuring

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82 Moon Agreement, *supra* note 13, art. 11(1).

83 Moon Agreement, *supra* note 13, art. 11(7)(d).

84 Indeed, ratification of the Moon Agreement has sometimes negatively affected a state with respect to its involvement in the United States space program. Most notably, Australia's ratification of the Moon Agreement caused significant concern for the United States when considering whether to conclude a treaty with Australia for locating an emergency landing facility for its shuttles.

approximately one third of the earth's surface. Thus, a service provider can provide almost global coverage with just three satellites. This fact makes the GSO particularly valuable for telecommunications, meteorological and other service providers.

Several characteristics particular to the GSO have also required the regulation of its use. These relate both to the position of the satellites within orbit and the frequencies at which those satellites transmit signals. Because the GSO is relative to a particular position on and distance from the earth, the number of positions in the orbit, called orbital slots, are limited. It has been estimated that the GSO could accommodate roughly 1800 satellites, each located 0.2° from each other, without facing the risk of collision or interference. Currently, the number of satellites is far from this figure and thus the risk of collision among satellites in the GSO is relatively low. The more imperative problem relates to the possibility of radio frequency interference between systems. If two different transmissions are made in the same geographic area at the same frequency, they will interfere with each other, leading to loss or deterioration of the signal. The distance required to operate the same frequency without interference is much greater than the 0.2° between slots. Failure to properly coordinate frequencies has resulted in real problems.[85] As a consequence of these impediments, the geostationary orbit is considered to be a limited natural resource.

The regulatory regime which has been developed from issues related to the GSO provides a second example of, this time a successful, balancing the issues of incentivizing development and innovation through the acquisition of a proprietary interest in the use of the orbital slot and frequency and the need to ensure an equitable distribution of benefits between those with present access and those without. Again, the debate was highly polarized. Those who could access the GSO preferred the incumbent 'first-come, first-served' principle on which the system of allocation operated. The developing countries

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85 *See* K.U. Schrogl, *Question relating to the character and utilization of the geostationary orbit*, *in* INTERNATIONAL SPACE LAW IN THE MAKING: CURRENT ISSUES IN THE UNITED NATIONS CONVENTIONS ON THE PEACEFUL USES OF OUTER SPACE 151 (K.U. Schrogle & M. Benkö eds., 1993); R.S. Jakhu, *The legal issues of the geostationary orbit* 7 ANNALS AIR & SPACE L. 333 (1982).

advocated a system of *a priori* distribution to ensure access.[86] After nearly two decades of disagreement, the WARC-ORB-88 modified the 'first-come, first-served' principle to provide more equitable access to developing countries.[87] While recognizing the allocations created under the old system, a new system of allocation provided each country with a nominal allotment in terms of both space and frequency.[88] The provisions of WARC-ORB-88, regulating property in terms of usufruct, generally comport with space law.

B. Going Forward: Some Suggestions and Considerations

The success of the ITU's WARC-ORB-88, when compared with the failure of the Moon Agreement to garner any significant form of support, suggests the need for a more flexible approach to the issue of incentivizing rapprochement and the value of compromise. Compromise has many advantages in terms of increasing the legitimacy of the outcome reached and, thus, of ensuring compliance while achieving the substantive goals of technological progress and distributional equity. A comparison of the relative

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86 *See* Baca, *supra* note 21, at 1079 ("The developed nations preferred the flexibility of the old process based on case-by-case coordination and first-come, first-served priority. … On the other hand, the developing nations favored a rigid *a priori* plan that would guarantee access in the future. The developed nations, while optimistic that all nations may be accommodated in the orbit, feared that the *a priori* planning approach would promote rigid technical specifications and remove incentives for technical innovation. The result of such a plan could be an artificial scarcity in orbit positions and inefficient and inequitable use of the resource in general."). *See also* Milton Smith, *A New Era for the International Regulation of Satellite Communications*, XIV ANN. AIR & SP. L. 449, 450 (1989) (noting that "[m]oreover, the concerns of developing countries regarding their future access to the orbit/spectrum resource were understandable in light of the increasingly intensive use being made of that resource by developed countries. Although developed countries contended that advancing technology provides a guarantee for future access, developing countries had a general distrust of solutions based on technology since advanced technologies are often not affordable for them." Smith, a legal advisor to the US WARC-ORB-88 delegation, goes on to develop the developed countries' position, already described in Baca, *supra* note 21, at 1079.).

87 For an analysis of the WARC 88 and of its main innovation see: C.Q. Christol, *The legal status of the geostationary orbit in the light of the 1985-1988 activities of the ITU*, PROC. THIRTY-SECOND COLLOQUIUM ON L. OF OUTER SPACE 215 (1989); S. Ospina, *The ITU and WARC_ORB: will the revised radio regulations result in a sui-generis legal regime for the GSO?*, PROC. THIRTY-SECOND COLLOQUIUM ON L. OF OUTER SPACE 247 (1989); T. Lozanova, *Legal status of the geostationary orbit in the light of the recent activities of ITU*, PROC. THIRTY-SECOND COLLOQUIUM ON L. OF OUTER SPACE 233 (1989).

88 Smith, *supra* note 86, at 455-56.

success and failure of the two regimes yields some potentially important considerations when addressing a future regime for exploitative activities on the Moon or other celestial body.

Perhaps most obvious is the role actual technological capabilities played in influencing position. Compromise was most certainly a more pressing issue in the case of the GSO in the 1970s and 1980s than current concerns of overuse of limited lunar resources. In the case of the GSO, satellite technology was both present and increasingly used by a select number of advanced countries. In the Bogota Declaration of 1976,[89] a number of developing countries along the equator attempted to exclude the GSO from the definition of outer space in order to assert control over the resource. Moreover, the agenda set for WARC-ORB-88 was perceived as a last chance to achieve a solution eight years in the making.[90] Failure, therefore, would have been a much more tangible loss in the case of the GSO, as compared to the general air of noncommittal in the case of exploitation on the moon.

A comparison of the two regimes also highlights some interesting conclusions relating to the role institutions play in the structure of a negotiated compromise. Specifically, the case of WARC-ORB-88 suggests the value of having a credible, existing regulatory organization in reaching a negotiated solution. Where such an organization exists, strong levels of delegation and agreement to be bound to commitments undertaken can make up for vague expressions as to the scope of commitment.[91] Indeed, a relatively low level of precision in language may prove more effective in institution-building than caging the institution within a set of precisely-framed competences.[92] In the case of WARC-ORB-88, the availability of the ITU, an international

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89 Declaration of the First Meeting of Equatorial Countries, Dec. 3, 1976. The Declaration has been reproduced in 6 J. SPACE L. 193 (1978).

90 Smith, *supra* note 86, at 452. ("The knowledge that no additional session was scheduled to resolve matters, if this session proved unsuccessful, mandated a business-like approach without resorting to extraneous political issues.").

91 This is a central argument of the legalization literature. *See e.g.* Kenneth W. Abbott et al., *The Concept of Legalization* 54(3) INT'L ORG. 401, 405-06 (2000). (discussing the Sherman Act, the EEC competition law provisions, and the 1987 Montreal Protocol on Subtances that Deplete the Ozone).

92 *Id.* (noting the favorability of the vague provisions in the Sherman and EC Treaty).

organization with a historical record of fairness and effectiveness, was of critical importance in terms of both setting the agenda for compromise and providing an institutional framework to which states could delegate monitoring and compliance tasks. In contrast, the Moon Agreement committed states to a vaguely described third party organization while making explicit and precise commitments as to the distribution of any benefit derived from a particular state's activities. The high level of precision in the commitments undertaken in the Moon Agreement is a prime example of too much too soon.

V. CONCLUSION

While this article has addressed a number of themes, analysis has converged on two points. First, it has evaluated the present legal regime and articulated specific problems to the further development of commercial space in the area of the exploitation of resources on the Moon and other celestial bodies. Such issues have focused on the creation of legal certainty to incentivize the research and development of space technology and on the legal means of incentivizing sustainability in exploiting such resources. Second, the article has demonstrated that in order to achieve the goals of certainty and sustainability, state parties will have to address the issues related to the distribution of the benefits of such activities. In this regard, the Moon Agreement and WARC-ORB-88 have provided some initial means of exploring possible structures. The failure of one and the success of the other further suggest a path towards an acceptable regulatory regime for the exploitation of the moon and other celestial bodies.

Governmental Regulations on Commercial Aspects of China's Space Activities

Bin Li[1] & Haifeng Zhao[2]

ABSTRACT

Launching service trade and trade in missiles and missile technology are two typical commercial aspects of space activities. Trade liberalization and security concerns are the key issues dealt with by governmental regulatory works. This article will analyze the legal framework and basic rules of China's governmental regulation as well as their implementation, shedding lights on the interaction between China's domestic regulation practices, foreign legislation and international standards. This article considers that governmental regulations on commercial aspects of space activities among space faring states have a common policy-driven character. China contends the unjust governmental regulations impeding liberal trade – particularly U.S. export control regime – and claims that it complies with international standards on non-proliferation. In the absence of multilateral regime governing trade relating to space activities, divergences arising from governmental regulations can only be narrowed through bilateral or unilateral means. As an emerging space faring state which actively engages in trade relating to space activities, China needs to demonstrate that it is a reliable and trustworthy member of the international community. For that purpose, more efforts should be made in order to guarantee the enforcement of the regulation rules, creating in turn a transparent and predictable legal context beneficial to China's own business.

CONTENTS

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I. INTRODUCTION

In the past two decades, China has made rapid progress in space exploration. Although the age of privatization and commercialization of space activities has not yet really come,[3] China has already engaged in some business practices relating to space technologies. The development of launch vehicles marked the first use of a high technology upper stage and led to China's entry into the commercial space launch services market.[4] From 1990 to 1998, China gained a 7-9% share in international commercial launch market.[5] Recently, the Chinese government has adopted a policy of encouraging industrial and

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3 Huang Huikang, *Space Law and the Expanding Role of Private Enterprises, with Particular Attention to Launching Activities* 5 SING. J. INT'L & COMP. L. 55, 56 (2001).

4 Gordon Pike, *Chinese Launch Services: A User's Guide* 7(2) SPACE POLICY 103-115 (1991).

5 *See* Sun Qing, *China Returning to International Commercial Launch Service Market* AEROSPACE CHINA 7 (2005).

commercial application of space technologies,[6] which indicates a strong potential of commercial development in China's space exploration. In the long term, trade and services relating to space activities will be progressively emerge as an important sector of China's foreign economic relations for both financial and political reasons.

Space activities are among the strategic sectors of every space faring country. Trade relating to space activities, particularly the trade in launch service, missiles and missiles technology, is closely linked to strategic policies – national defense, non-proliferation etc. – more than any other trade fields. The efforts in liberalizing trade relating to space activities are counterbalanced by security concerns.[7] China's status as an emerging launch service provider and a potential missiles and missile technology exporter makes it particularly affected by the interface between liberal trade and security concerns.

This article will analyze China's governmental regulations on the two prominent commercial aspects of space activities: on one hand, launch service as a form of international trade in service which is also a typical commercialized space activity as of now and on the other, the international trade on launch vehicles, including particularly missiles which can be easily converted into an important launch tool. However, the export and import of missiles as well as other specific types of weapon are tightly regulated, which amounts to a trend that runs in the opposite direction to trade liberalization.[8] As much as China's domestic regulatory measures could have implications beyond its border, foreign legislations and international norms can also produce strong impact on China's domestic regulation. In other words, governmental regulation on commercial aspects of space activities is characterized by the interaction among different sources of regulatory rules. Before getting an

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6 In 2007, the State Development and Reform Commission (SDRC) and the former State Commission of Science, Technology and Industry for National Defense (COSTIND, replaced now by the Ministry of Industry and Information Technology in 2008) adopted a joint Notice of Guiding Opinions on the Development of Satellite Application, emphasizing that satellite communication, satellite positioning system, remote sensing as priority sectors of satellite application industry that will enjoy national strategic support. *See* NDRC and COSTIND, *Notice of Opinions on Promoting the Industry of Satellite Application*, FAGAIGAOJI 3057 (2007) (Nov. 16, 2007).

7 Dunniela Kaufman, *Does Security Trump Trade?* 13 SUM L. & BUS. REV. AM. 619, 619 (2007).

8 Asif Efrat, *A Theory of International Regulated Goods* 32 FORDHAM INT'L L.J. 1466, 1466 (2008).

insight on the abovementioned issue, features of China's domestic legislation on commercial aspects of space activities shall be briefly described.

II. FEATURES OF CHINESE LEGISLATION ON COMMERCIAL ASPECTS OF SPACE ACTIVITIES

Chinese officials and scholars have already felt the necessity of establishing a comprehensive legal framework governing the commercial application of space science and technology, with a view of establishing a fair and competitive market, appropriately settling liability issues, regulating the relationship between governmental agencies and private entities etc.[9] Given the ongoing commercialization of space activities, domestic legislation is considered to be even more essential, since "international space law was incapable of dealing with the commercial development of outer space".[10] Before the advent of a new international legal regime that provides legal clarity, commercial stability and technological adaptability, national laws play an essential role in filling the lacunae and will probably influence the form and content of international norms in the future. Chinese space law is currently only in its infancy. However, it meets the minimum needs for governing national space activities and fulfilling international obligations.[11] The draft and adoption of a basic domestic law governing space activities in China is not yet on the legislation agenda of the National People's Congress. As status quo stands, governmental regulations on space activities are and will be based on the existing laws and regulations. This is particularly true insofar as the economic dimension of space activities in China is concerned. In fact, law and regulations dealing with foreign trade and international economic relations provide the legal basis for governmental regulation on space activities of commercial nature.

China has a longer history in developing the space industry than using laws and regulation as tools for governing space activities. From the point of

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9 *See e.g.* Liu Xiao-hong, *Reflections on the commercialization of normalization of space activities in China* AEROSPACE CHINA 12-15 (2001).

10 Ricky J. Lee, *Reconciling international space law with the commercial realities of the twentieth-first century*, 4 SING. J. INT'L & COMP. L. 194, 195-196 (2000).

11 Ling Yan, *Comments on the Chinese Space Regulation* 7 CHINESE J. INT'L L. 681, 689 (2008).

view of civil space activities, in the strict sense, there are no laws and administrative regulations currently in China, but only a number of regulating measures adopted by several different governmental agencies.[12] The situation can be explained by the fact that legal instruments have played a very weak and limited role for the purpose of governance in China. The special nature of space activity, along with political, legislative and technical reasons, makes it even less possible to adopt a formal law in the foreseeable future. Among political reasons, the most salient one lies in the distribution of powers among different state organs, civil and military, in terms of control over space activities. On one hand, civil and military space activities have never been clearly delineated because of the dual-usage character of some space activities and products and the practical parallel undertakings in some areas, such as satellite launchings. On the other hand, many state organs of ministerial level could be involved at different stages and sections of a space project.[13] This makes it very complicated, even impossible for the double-usage space activities, to clearly define each state organ's power and competence. This will be an unavoidable issue in the draft of a codified law on space activities.

Although scholars have advocated changing the current decentralized and multi-agency model of management of space activities through the adoption of a formal national space law, which would replace the current low-level regulative texts,[14] no significant progress has been made up to

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12 Haifeng Zhao, *The Status Quo and the Future of Chinese Space Legislation* GERMAN J. AIR & SPACE L. 100-101 (2009).

13 The so-called multi-sectors refers to the State Council and other space-related institutions such as the former State Commission of Science, Technology and Industry for National Defense (COSTIND), actually the National Bureau of Science, Technology and Industry for National Defense (BUSTIND) under the administration of the Ministry of Industry and Information Technology, the Ministry of Foreign Affairs, the Ministry of Commerce, the Chinese Academic of Sciences, the State Development and Reform Commission and other ministerial departments. As to matters relating to space military activities, they are charged mainly to the Chinese People's Liberation Army General Armament Department. The non-proliferation and export control issues relating to aerospace products are regulated by the State Council, the former COSTIND, actually the Ministry of Industry and Information Technology, the Ministry of Commerce and the General Armament Department.

14 *See e.g.* Haifeng Zhao, *Some reflections on China's space legislation (Guanyu zhongguo kongjian lifa de ruogan sikao)* 5 HEILONJIANG SOCIAL SCIENCES 150 (2007).

this date in this respect. Besides those governmental departments in control of civil and military space activities, two important state organs in the domain of foreign trade – the Ministry of Commerce and the General Administration of Customs – also exercise powers of control, supervision and guidance relating to commercial space activities. Maintaining status quo is a tactic for avoiding politically sensitive debate on power reallocation. Yet, the question remains open on the distinction of regulative powers among different state organs. However, the current situation will be an impediment to a timely and effective collaboration among different organs for dealing with some specific regulation matters. From the legal point of view, the answer to the question of whether or not China should have a basic law on space activities may be found in the constitutional law. The legislation promulgated in 2000 defines in Article 8 the subject matter which should be imperatively dealt with by laws adopted through formal legislative procedure. Space activities, despite their strategic nature, do not figure among those subject matters enumerated in items 1 to 9 by Article 8. However, space activities could be included in item 10 of the same article as "other matters on which the National People's Congress and its Standing Committee must enact laws", following a purposive and autonomous interpretation made by the National People's Congress (hereinafter NPC) and its Standing Committee themselves.[15] In other words, whether or not China shall adopt a formal space law depends on the NPC and its Standing Committee as they consider appropriate.

A more practical reason explaining China's restraint from adopting a formal and basic law on space activities lies in the fact that space exploration has been largely monopolized by state. Individuals and private entities have

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[15] Article 8 of the Law on legislation enumerates the following matters which shall be governed only by law: 1) matters concerning state sovereignty; 2) the formation, organization, functions and powers of people's congresses, people's governments, people's courts and people's procuratorates at various levels; 3) the national regional autonomy system, special administrative region system and grass-roots mass autonomy system; 4) crimes and punishments; 5) compulsory measures and penalties such as deprivation of citizens' political rights and restrictions on personal freedom; 6) acquisition of non-state-owned property; 7) the basic civil system; 8) basic economic system and basic systems on finance, taxation, customs, banking and foreign trade; 9) procedural and arbitral systems; and 10) other matters on which the National People's Congress and its Standing Committee must enact laws.

rarely invested in space operations except for a few state enterprises.[16] Moreover, there is a *de facto* administrative hierarchical relationship between state organs and state enterprises, which is not formally dealt with by law. As a result, using governmental regulations and measures to control space activities is more straightforward and cost-efficient, particularly where those state enterprises involved in space operations are often directly subordinate to different state organs. It is worth to point out that those who advocate drafting a basic law on space activities are more often than not space lawyers and officials who do not exercise the direct control of space operations.

The absence of formal and basic space law in China could also be interpreted from a technical point of view. China's space activities are making a very rapid progress in the past five years: *Shenzhou* manned spaceflight, Chang-e lunar probe mission, the prospective space station etc. Had China had already a formal law, the aforementioned space operations would not have been anticipated. The law would have become outdated and consequently, needed to be modified from time to time in order to fit actual needs. As a result, legal certainty, stability and predictability would not have been guaranteed with regard to the constant development of China's space capacity. Furthermore, some important achievements like manned space operations have been realized in the absence of any relevant administrative regulations. Space science and technology progress much faster than the law-making process. Taking into account China's accelerating space technology advancement, a formal and basic space law ideally aspired by space lawyers will probably be a visual decoration to China's space activity without any substantial utility, due to its general and inoperable characters. At the current

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16 China's space technology research, development and application are mainly concentrated into the hands of China Aerospace Science and Technology Corporation (CASC). CASC is a large state-owned enterprise group originating from the Fifth Academy of the Ministry of National Defense established on October 8, 1956 and experiencing the historic evolution of the Seventh Ministry of Machinery Industry, the Ministry of Space Industry, the Ministry of Aerospace Industry and China Aerospace Corporation. CASC was formally founded on July 1, 1999 with the approval of the State Council, as an institutional investor. It has eight large R&D and production entities, including such as China Great Wall Industry Corporation (GWIC), China Satellite Communications Corporation and other institutions and companies directly subordinated to it. Represented by its listed holding companies, CASC has a number of high- and new-tech enterprises dealing with research, development and production of the civilian products relating to satellite applications. More detailed information available at http://www.spacechina.com/english/home.shtml.

stage and in the foreseeable future, a model of subject-by-subject and space-targeted administrative regulation seems to be more appropriate to China's reality. Furthermore, China's past and present practices in regulating commercial aspects of space activities confirm the above point of view.

Although domestic law is essential to the regulation of commercial aspects of space activities, one can not negate the relevance of legal rules of the international trading system. As a matter of fact, both China and other space faring countries have resorted to trade restrictive measures to address concerns such as national security. Governmental regulations on commercial aspects of space activities are not only subject of domestic law but also that of international economic law. Trade restrictive measures are addressed by multilateral trade rules and, notably, the law of World Trade Organization (WTO). Since China's membership in 2001, the law of WTO may also have some implications on the measures taken for the restriction of trade relating to space activities, whether they are taken by China or are those China has suffered from. As far as international launch services are concerned, China is a competing actor with regard to Europe, Russia and U.S.A. Due to the fact that launch service is *per se* a trade in service and closely connected with export restrictions on satellites and other defense articles, governmental regulations on commercial launch service could fall into the scope of application of GATT, 1994 and GATS. As a result, the compliance with WTO rules may need to be taken into consideration. However, until now little attention has been paid to the issue in China.

III. LEGAL FRAMEWORK OF COMMERCIAL LAUNCH SERVICES

China entered into the international market of launch services towards the end of 1980s. The first agreement between China and the U.S. i.e., *Memorandum of Agreement between the Government of United States of America and the Government of the People's Republic of China regarding international trade in commercial launch services* (hereinafter referred to China-U.S. "M.o.A") was signed in 1989. It is until 2002 that China had an administrative regulation on civil satellite launching, i.e., *Interim Measures on the Administration of Licensing the Project of Launching Civil Space*

Objects (hereinafter referred to as "License Measures 2002"), adopted by former COSTIND. Inter-governmental agreements continue to be an important legal basis for realizing cooperation in the field of launch service and relevant space technology transactions. From 2001 to 2006, China has signed 16 international space cooperation agreements and memorandums with 13 countries, space agencies and international organizations[17], including for example the cooperation agreement between the government of the People's Republic of China and the European Space Agency concerning space cooperation for peaceful purpose signed in 2005. In addition to inter-governmental agreements, a series of commercial contracts on international launch services have been made by the Chinese launch service provider and foreigner users.[18] One can reasonably deduce that detailed legal issues relating to commercial launches are regulated by those bilateral inter-governmental agreements and commercial launch service contracts rather than by Chinese domestic law and regulations.

The U.S. China bilateral launch trade experiences demonstrate that political, economic and legal considerations have been taken by the U.S. in deciding whether or not China should be given the access to the U.S. launch service market.[19] With regard to economic considerations, much attention has been given to the impact of China's entry into international launch market on the U.S. domestic launch industry, particularly in terms of price competition between the foreign launch services provider and the U.S. domestic launch industry. For the U.S., as a dominant satellites producer, export control is a very effective legal instrument to prevent foreign launch services providers from entering into American domestic launch market for both economic and security considerations.[20] In accordance with the export control mechanism, U.S. companies contracting launch service to Chinese entities shall apply for licenses for the export of satellite and related defence articles listed in the U.S. Munitions List, which is necessary for the launch operation.

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17 *See* Information Office of China's State Council, *China's Space Activities in 2006* (2006).

18 For example, China Great Wall Industry Corporation has recently entered into bilateral launching agreements with Venezuela and Bolivia. More detailed information available at http://www.cnsa.gov.cn/n615708/n620172/n677078/n751578/167206.html,http://www.spacechina.com/xwzx_zyxw_Details.shtml?recno=65720.

19 H. PETER VAN FENAMA, THE INTERNATIONAL TRADE IN LAUNCH SERVICES 183-198 (1999).

20 The export of most satellites is covered by the Arms Export Control Act (AECA) and the accompanying International Traffic in Arms Regulations (ITAR). The manufacture or export of items included on the ITAR Munitions List must be registered with the Office for Defense Trade Control (ODTC). Most satellites are included within the coverage of the Munitions List because

The recalling of U.S.-China experiences is not irrelevant in analysing the legal framework of commercial launch services in spite of the downturn of U.S.-China launching trade relation in the past ten years. As a matter of fact, as China continues to enter into satellite launch service with France, Brazil and some other developing countries,[21] the legal framework of launch services between China and THE U.S. is a useful reference.

A. The Significance of Intergovernmental Agreements

China started to engage in the commercial launch services towards the end of 1980s and attracted American users with its low prices. At that time, commercialization of launch services was well underway and even encouraged in the U.S. Although the U.S. government will not re-enter the commercial launch industry, it is still required to protect domestic launch service providers. It was considered that some governmental involvement at the regulatory level is needed to prevent hyper-competition and unfair trade practices by foreign launchers.[22] Because liberalization of launch services trade also produced certain incidents of concern pertaining to the proliferation of what was considered by the U.S. as sensitive technology, economic space treaties were needed as a delicate attempt to balance the liberalization of trade in the space launch industry with the concerns of national security in space and the proliferation of weapons technology.[23]

As a condition for getting U.S. export licenses necessary to the launching services, U.S. and China have negotiated and concluded bilateral agreements

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they qualify as "inherently military". The export of items on the Munitions List is prohibited to certain countries, and export licenses are required for export to all other countries. Applications for export licenses under AECA are reviewed by the Department of Defense, as well as other interested agencies, and occasionally by the Coordinating Committee on Multilateral Export Controls (COCOM). Since commercial communications satellites are specifically excluded from AECA coverage, their export must be analyzed under the Export Administration Act of 1979 (EAA).

21 China Academy of Space Technology, *On the twentieth anniversary of China's entry into world launch service market (Zhongguo hangtian zoujin guoji shangye fashe fuwu shichang ershinian)*, http://www.cast.cn/CastCn/Show.asp?ArticleID=35101. *See also* José Monserrat Filho, *Brazilian-Chinese Space Cooperation: an Analysis* 13(2) SPACE POL'Y 153-170 (1997).

22 Timothy A. Brooks, *Regulating International Trade in Launch Services* 6 HIGH TECH. L.J. 59, 81 (1991).

23 Michel Bourbonniere, *National-Security Law in Outer Space: the Interface of Exploration and Security* 70 J. AIR L. & COM. 3, 30-31 (2005).

setting down the basic terms of China-U.S. launch services, which have expected to reassure the U.S. concern for fair trade. Moreover, the American satellite industry is as important as the launch industry, and to compete internationally, satellite makers believe that they must have access to all available launchers. Export controls is thus a double-bladed sword, it could protect the domestic launch industry and prevent the undesirable transfer of sensitive technology, while at the same time hurt the satellite industry. In other words, export control shall be exercised while balancing the different interests concerned. Intergovernmental arrangements are thus needed to achieve the purpose of reasonable export control.

The China-U.S. intergovernmental agreements laid down the legal foundation for launch service trade. On December 17, 1988, representatives of the China and U.S. governments signed two agreements, one on satellite technology safeguards, and the other on liability for satellite launches. On January 26, 1989, the two governments signed a Memorandum of Agreement Regarding International Trade in Commercial Launch Services. It was the last of the three agreements required by President Reagan's decision, announced on September 9, 1988, to issue export licenses for the use of Chinese space launch services for three U.S.-made communications satellites.[24] Two of the satellites were to be built by Hughes Aircraft for an Australian entity, AUSSAT, and the third, a Hughes-built satellite (formerly known as Westar 6 and salvaged from orbit by the space shuttle in November 1984), was to be overhauled for ASIASAT, a Hong Kong-based consortium composed of a United Kingdom, a Hong Kong and a People's Republic of China company.[25]

There are several reasons for the government's intervention in China-U.S. commercial launching trade. One of them is national security concerns covering the viability of the U.S. expendable launch industry to assure access to outer space for national defense purposes and the protection of sensitive U.S. technologies with potential military applications.[26] However, economic

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24 For the texts of the three agreements, *see* 28 ILM 596 (1989). The agreements entered into force on March 16, 1989. The licenses were issued and the Government of the People's Republic of China was notified on the same day.

25 Marian Nash Leich, *Commercial Launch Services: United States-People's Republic of China* 83 AM. J. INT'L L. 561, 561 (1989).

26 *Supra* note 19, at 186.

considerations play as much of a role as security concerns, particularly technology safeguards. The first two China-U.S. agreements were respectively dedicated to the protection of U.S. interests in launch service industry and technology safeguards. Moreover, at the moment when China was admitted access to U.S. launch market, there was an important lacuna concerning China's legal liability as the launching state in case of different damages caused by the accident or failure of launching. A third intergovernmental agreement was thus concluded for filling the gaps.

However, immediately after the Tiananmen Square event, all licenses and approvals to export defense articles – covering all but telecommunication satellites, as well as satellite components – and defense services from U.S. to China were suspended.[27] The U.S. Congress has intended to prohibit the issuance of export license for launches in China because of political and economic reasons.[28] Despite the unfavourable political context, former President George H. W. Bush was able to avoid the scope of this prohibition in approving the launch AsiaSat on the Long March rocket through the use of a substantial national interest exception.[29]

On September 5, 1990, the Commercial Space Launch Policy was announced. It was influenced by a post-Cold War desire to ease national security considerations, and was intended to clarify and replace the *ad hoc* approval practice that had governed past license approvals. In a move to increase U.S. competitiveness in world launch provider markets, the Space Launch Policy sets a high priority for international trade negotiations regarding the space industry in view of concluding bilateral agreements that define principles of free and fair trade and make sure that those principles are both enforceable and enforced. Non-market launch providers including China and the ex-Soviet Union presented a special case for the implementation of free and fair trade in space goods and services. As a result, the Space Launch Policy recognized that special conditions might be required during a transition period for these economies so they might adjust their space launch services to a

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27 Department of State (Office of Munitions Control), *Suspension of Munitions Exports to P.R.C.* 54(108) FED. REGISTER (1989).

28 *See* Pub. L. No. 101-162, § 610, 103 Stat. 988.

29 *Supra* note 19, at 213.

market oriented price and cost structure. In furtherance of this goal, the U.S. would negotiate agreements which set forth a common approach to provide for the entry of non-market economy countries into the commercial launch services market.[30] This article's analysis will focus on the impact of the agreements on Chinese government and the latter's reaction, as well as the relevance of WTO rules on the bilateral arrangements in launch services trade.

B. Two Substantial Conditions on China's Access to International Commercial Launch Services Market: Price and Market Share Commitments

The 1989 China-U.S. Memorandum of Agreement concerning international trade in commercial launch services provides for two substantial obligations in respect to China's regulation on the supply of international launch services by its domestic companies. They are requirements on fair pricing and correlatively the prohibition of governmental inducements on one hand, and a limitation on market share on the other.

Insofar as pricing is concerned, Article I b (ii) of the Memorandum of Agreement provides that, "[t]he PRC shall require that its providers of commercial launch services offer and conclude any contracts to provide commercial launch services to international customers at prices, terms, and conditions which are on a par with those prices, terms, and conditions prevailing in the international market for comparable commercial launch services". As a result, the Chinese government should establish a license regime in order to control the price bid by domestic launch services providers. However, China did not have any formal licensing requirement on the launching of civil space object until the entry into force of *Interim Measures of the Administration of Licensing the Project of Launching Civil Space Objects* in 2002 (hereinafter Licensing Measure 2002), issued by the former State Commission of Science, Technology and Industry for

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30 David J. Kuckelman, *Regulation on Exports for Commercial Space Launch Outside the United States* 38 FED. B. NEWS & J. 135 (1991).

National Defense (COSTIND, replaced in 2008 by the newly established Ministry of Industry and Information Technology). The absence of a relevant administrative regulation could be explained by the fact that China did not need a formal administrative rule in order to implement its obligation under the China-U.S. 1989 Memorandum with regard to fair price. As a matter of fact, although the abovementioned Memorandum uses the plural form of "providers", only GWIC has been permitted by Chinese government to conclude international launch contracts.[31] Nevertheless, with the potential emerging of private international launch service providers, the Licensing Measure 2002 could become a substantial governmental control mechanism for ensuring the fair price as required by the China-U.S. Memorandum of Agreement. Article 5 (2) of the Licensing Measure 2002 provides for, as one of the conditions for obtaining license, that the launching project shall not endanger national security, cause damages to national interest and *be in conflict with State's foreign policies and international conventions that have already been concluded by China and entered into effect* (emphasis added by author). The latter could be interpreted in such a way that through licensing measures, the Chinese government could effectively examine and control the international launch projects undertaken by its domestic launch service providers with regard to China's obligations under international agreements, such as the China-U.S. Memorandum of Agreement.

The objective of issuing Licensing Measure 2002 is to demonstrate that Chinese government has the capacity to regulate international launch services in conformity with its obligations under international law. However, it remains controversial on the issue of whether China has the intention to honour its international engagements by enforcing relevant domestic law and regulations. From what has been observed, from the time that China attempted to enter into the commercial market in the late 1980s, the U.S. and Europe claimed that GWIC's launches received on-going subsidization; whereas China denied subsidizing its launch industry and attributed its bargain prices

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31 Zhou Wei, *International Space Law and Chinese Domestic Law and Policy on Commercial Launch Services (Lun guoji kongjianfa yu zhongguo guoji shangye weixing fashe fuwu de zhengce fagui)* AEROSPACE CHINA 13 (2004).

to the low costs of materials and labour.[32] Actually, the question whether or not GWIC has received subsidies from the Chinese government is difficult to assess in an objective manner, particularly due to the fact that different countries have different economic contexts, and the policies for supporting domestic industry are wide-ranging.[33] In addition, it is probably fruitless to attack GWIC on the ground that it received government subsidy. Proving the "actual cost" of GWIC launches would be extraordinarily difficult, artificial and as a result unlikely to be convincing. The better inquiry is to ask whether China has engaged in unfair pricing, designed to steal market share from western suppliers.[34] However, in the absence of any agreed verification mechanism, the debate on whether China has assumed its obligation in ensuring a fair launch services trade through price control is of economic rather than legal character. In the short term, it seems that the rejection of export licenses could be an effective solution in preventing foreign competition from harming domestic launch industry, but in the long run, the competitiveness of launch services providers will certainly become a key element that determines market share.

Besides price control, China has also undertaken to restrict its market share of international launch services trade. In accordance with the 1989 China-U.S. Memorandum of Agreement, "[i]n addition to meeting the needs of domestic Chinese satellite launches, its providers of commercial launch services are only able to offer a limited number of communications satellite launches each year for international customers. Chinese launch services, therefore, are only a supplement to the world market, providing international customers with a new option", "(i) PRC providers of commercial launch services shall not launch more than 9 communications satellites for international customers (including the two AUSSAT and one ASIASAT satellites) during the period of this Agreement, and (ii) The PRC shall require that any commitments to provide commercial launch services to international

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32 *See* Ling Yan, *Some Legal Problems of China's Commercial Launch of Satellite (Zhongguo shangye fashe weixing zhong de ruogan falv wenti)* 3 J. FOREIGN AFFAIRS COLLEGE (WAIJIAO XUEYUAN XUEBAO) (1992).

33 Bill C. Lai, *National Subsidies in the International Commercial Launch Market* 9(1) SPACE POL'Y 17-34 (1993).

34 Jon C. Garcia, *Heaven or Hell: the Future of the United States Launch Services Industry* 7 HARV. J. L. & TECH. 333, 357 (1994).

customers by PRC launch service providers are proportionately distributed over the period of the Agreement". The limitation on China's market share, as well as the distribution of its market share, are far more stringent than the price control, considering that market share commitment is more enforceable and the result of which is more predictable than in the case of price control. Controversies could arise in assessing whether or not the Chinese contractors' price policy conforms to the intergovernmental agreement; by contrast, China's performance in market share restriction could be evaluated in a more objective way. As a result, the market share commitment made by Chinese government can help the U.S. government to more effectively and efficiently protect its domestic launch industry, when compared with price control. By its very nature, market share commitment doesn't differ substantially from the quantitative restrictions, such as export quotas in the case of trade in goods. It directly restricts the expansion of China's capacity in providing international launch services. Despite that, market share commitment is not a mutual benefit arrangement and only favours the U.S. and its launch services provides, China had to accept it as a "price" in exchange for the issuance of export licenses by U.S. government, which was a prerequisite of entry into the international launch service market.

The market share arrangement made in China-U.S. Memorandum of Agreement reveals the disequilibrium between service provider and buyer in the international launch trade market. Launch services buyers – mostly satellite owners – occupy a relatively monopolistic position with larger margin of negotiation on terms of transaction than launch services providers. In fact, China suffers because of the launch market which is controlled by the dual-oligarch of America and Europe.[35] After very hard negotiations, a new agreement was concluded between Chinese and U.S. governments in 1995. This new agreement raised China's market share from the launching of 9 communication satellites to 11 satellites (not limited to communications satellites) within a 7 years' period.[36] The 1995 agreement has expired at the end of 2001. In order to renew the agreement and augment the market share,

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35 Mi Jia-ning et al., *China's Aerospace Technology for Entering International Business Launch Market (Jinru guoji fashe shichang de woguo hangtian jishu)* 22(6) STUDIES IN DIALECTICS OF NATURE (ZIRAN BIANZHENGFA YANJIU) 67-71 (2006).

36 The 1995 Memorandum of Agreement, http://www.nti.org/db/China/engdocs/splaagre_1995.htm.

several rounds of negotiations have been held. Although commercial launch services cooperation should be enhanced for purpose of avoiding an arms race between the U.S. and China, as some authors have advocated,[37] the negotiations have not made any substantial progress so far.[38] Currently, there is no longer any bilateral agreement in force dealing with launch service trade. That is also one of the drawbacks that make the launch business stagnant between China and the U.S.

C. The Relevance of WTO Law

Since space launch services, as well as commercial telecommunications (including those provided by satellite), remote sensing, space-based navigational aids are "services", they fall under the scope of application of General Agreement on Trade in Services (GATS). Following the above analysis, the cornerstone principle of most-favoured-nation treatment will govern the commercial launch services. The two conditional legal obligations provided by the GATS, i.e., market access and national treatment are applicable insofar as no option-out has ever been made in WTO members' schedules of commitments. Furthermore, on February 5, 1998, the WTO's Fourth Protocol to the GATS for Basic Telecommunications Services took effect, requiring signatories to open their telecommunications markets to foreign competition. That is seen as a legal document relevant to space activities, particularly the launch of telecommunication satellites.[39]

On the other hand, government subsidies for the development of launch vehicles and satellites are subjected to the GATT that addresses

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37 Theresa Hitchens et al., *Forging a Sino-US 'Grand Bargain' in Space Policy* 24(3) SPACE POL'Y 128-131 (2008).

38 On March 19-20, 2001, the United States and China conducted consultations under the "Memorandum of Agreement between the Governments of the United States and the People's Republic of China Regarding International Trade in Commercial Launch Services." This was the first bilateral consultation since the two sides met in Washington, D.C. in 1997. Since then, no formal consultation has ever been made between the two sides, and China and U.S. launch services trade seems to be at standstill. *See* report made by China National Space Administration (CNSA), *Bilateral Consultations on Commercial Launch Service Agreement*, http://www.cnsa.gov.cn/n615708/n620172/n677078/n751579/64888.html.

39 Major Elizabeth Seebode Waldrop, *Integration of Military and Civilian Space Assets: Legal and National Security Implications* 55 A.F. L. REV. 157, 186 (2004).

trade in goods;[40] and the export controls fall into the security exceptions provided by Article XXI of GATT 1994 and Article XIVbis of GATS. However, recalling the negotiation history of the GATS, one may find that the American lack of enthusiasm for the WTO forum was apparently rooted in its preference for bilateral negotiations. From the U.S. perspective, it makes sense to pursue bilateral deals and then try to "multilateralize" any agreements reached. Moreover, the comparative ease of achieving bilateral accords and their comparative efficacy in these circumstances are also likely enticements. The U.S. reticence in including launch services into GATS is due to the fact that the U.S. space industry is intent on protecting "buy American" provisions and other procurement restrictions favourable to the U.S. suppliers from foreign attack.[41]

Integrating launch services into GATS is certainly beneficial to China as an emerging launch services providers in terms of getting market access and non-discrimination treatments. This is true especially with regard to the past U.S. bilateral agreements which imposed important restrictions on the Chinese side. For example, although U.S. government has promised that it "does not provide government inducements of any kind in connection with the provision of commercial launch services to international customers which would create discrimination against launch service providers of other nations and has no intention of providing such inducements in the future",[42] there is in fact a major distinction between Russian Federation's and Chinese launch providers. The Chinese launch industry remains relatively isolated and offers a limited capability in launch vehicles. In contrast, the Russian Federation's participation in the launch services market is highlighted by international joint ventures, in particular Ukraine's joint venture with Boeing Aerospace, and a wider variety of space launch services.[43] It means that discrimination cannot be effectively fought against without a viable multilateral launch services trade system. GATS can be a useful instrument in keeping the world launch services

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40 Anders Hansson et al., *Commercial Space and International Trade Rules: An Assessment of the WTO's Influence on the Sector* 15 SPACE POL'Y 199, 201 (1999).

41 *Supra* note 34, at 361.

42 *See* art. II (C) of the 1995 China-U.S. Memorandum of Agreement.

43 James L. Reed, *The Commercial Space Launch Market and Bilateral Trade Agreements in Space Launch Services* 13 AM. U. INT'L L. REV. 157, 361 (1997).

market in order. In fact, the major concerns of fair competition addressed by bilateral agreement, such as the disciplines on government support, the on par price and non-discrimination requirements are substantially in line with GATS principles. However, China-U.S. bilateral agreements have totally excluded those issues from being compatible with GATS principles.

Moreover, China-U.S. bilateral agreements' impact goes far beyond bilateral launch trade relations: through the definition of "international customers" as "(a) any institution or business entity, other than those institutions or entities located within the territory of the PRC and owned or controlled by PRC nationals; or (b) any government other than that of the PRC; or (c) any international organization or quasi-governmental consortium; which is the ultimate owner or operator of a satellite or which will deliver the satellite to such ultimate owner or operator",[44] China was required to respect its price control and market share engagements towards all "foreign", instead of only American customers. In other words, China's obligations under China-U.S. bilateral agreement had worldwide implications. As a result, GATS is substantially marginalised in the international launch services trade between China and U.S. The very risk of such an arrangement lays in the fact that trade distortions could not be effectively avoided, and disguised protectionism could have prevailed in the name of protecting fair competition.

China's accession to WTO has not led to the renewal of China-U.S. bilateral agreements on commercial launch services. There are several reasons that can explain the situation. First of all, China-U.S. launch services trade has been suspended since the last launch of an American satellite by GWIC in 1999. It seems that Sino-American trade in launch services has become relatively less important to Chinese contractors at current stage. Furthermore, China is not yet a launch provider having full capacity to compete with U.S.A., Europe and Russia in the launch market.[45] Only in the long term will a fair legal regime on commercial launch services become more and more necessary to China. Secondly, launch services trade as a

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44 *See* art. 3 of the Annexe to the 1989 China-U.S. Memorandum of Agreement.

45 *See* Zhou Wei, *General Analysis on the 2009 World Market of Commercial Communication Satellites and Launch Services (2009 nian shangye tongxin weixing he fashe shicha zongshu)* AEROSPACE CHINA 21 (2010).

whole is not part of the priorities of China's foreign economic relations. The China-U.S. bilateral agreements did not amount to a major impediment to China's commercial space activities. The stagnation of China-U.S launch services trade relations has not prevented China from seeking potential customers from elsewhere other than U.S. Since 1999, China has turned to other space faring countries such as France and Brazil to engage in launching activities and other business transactions relating to space exploration.[46] Thirdly, "in-orbit" transfer of satellite to foreign customers, particularly customers of developing countries, has become a new orientation of China's commercial space activities.[47] Launch services would be combined with the export of the "made-in-China" satellites. For example, in accordance with the agreement between China Great Wall Industry Corporation and Bolivian Astronautic Agency, the former will deliver to the latter an in-orbit telecommunication satellite and ground apparatus. The project involves design, manufacture, launching and functioning of the envisaged telecommunication satellite.[48] Commercial launching service is covered by a wider legal framework governing the two inseparable segments of space operation, i.e., satellite launching and in-orbit transfer of satellite. Elaborating an independent legal document on launch service is practically less useful than ever. Lastly, WTO law contains flexible rules permitting its members to adopt restrictive measures as exceptions to the fundamental principles of market access and non-discrimination. Article XIVbis of GATS provides for the security exceptions according to which any Member could take "any action which it considers necessary for the protection of its essential security interests: (i) relating to the supply of services as carried out directly or indirectly for the purpose of provisioning a military establishment; (…)". The language of this provision is virtually identical

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46 For example, in November 2004, GWIC signed a satellite export contract with a Nigerian company for developing and launching a communication satellite. In April 2005, GWIC successfully provided launch service for APT Satellite Holdings Limited, Hong Kong to put the French-made satellite APStar6 into preset orbit. *See* Suo A-di, *Commercial Launch: China Makes Big Steps into World Stage (Shangye fashe: zhongguo dabu zouxiang shijie)* CHINA SPACE NEWS (ZHONGGUO HANGTIAN BAO) 2 (December 16, 2008).

47 *See* Zhang Hui-ting, *Analysis on the Strategies for China's Launch Industry's Expansion in the World Market (Zhongguo hangtian fasheye kaituo guoji shichang duice fenxi)* AEROSPACE CHINA 7 (2005).

48 *Supra* note 18.

to Article XXI of the GATT 1994. Unlike Article XX of the GATT 1994, Article XXI does not have a provision to prevent misuse or abuse of the exception contained therein. Furthermore, in view of the provision's wording, the question arises whether the exceptions provided for are "justiciable". In other words, the expression "any action which *it considers necessary* for the protection of its essential security interests" gives a Member very broad discretion to take national security measures.[49] Some authors have challenged the compatibility of U.S. export controls with GATT rules,[50] but export license could be safely maintained by the consumers' State in order to protect its domestic launch industry, except that panels and Appellate Body could conduct an examination at a minimum as to whether the measure constitute an apparent abuse. In fact, WTO dispute settlement practice has rarely addressed that issue.

With regard to WTO law, a fair, effective and legally binding multilateral trade regime on launch services has not yet been fully established. The negative impact of such a legal vacuum is, however, "offset" by the relatively less advanced commercial launches practiced by Chinese contractors. However, in the long run, with the increase of China's commercial launch capacity and consequently the shift of market shares, the current legal framework of commercial launch services will be changed.

IV. MISSILES EXPORT CONTROL MEASURES AND THEIR IMPLEMENTATION

Export controls have addressed space activities since the inception of the space age. Born contemporaneous to the atomic bomb, space and security are inextricably intertwined. The supervision requirement was created to assure that all national activities will be conducted in the spirit of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (hereinafter Outer Space Treaty). Export controls are a natural extension of this philosophy

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49 PETER VAN DEN BOSSCHE, THE LAW AND POLICY OF THE WORLD TRADE ORGANIZATION: TEXT, CASES AND MATERIALS 666 (2nd ed., 2008).

50 Michael Gaugh, *GATT Article XXI and U.S. Export Controls: the Invalidity of Nonessential Non-Proliferation Control* 8 N.Y. INT'L L. REV. 51 (1995).

as responsible space faring governments provide assurances that their national space capabilities will not be extended to irresponsible ones.[51]

Due to the similarity in functional principle between ballistic missiles and space launch vehicles, missiles export control is an integral part of national space law and foreign trade law. Beyond national laws, the prevention and curbing of the proliferation of ballistic missile systems capable of delivering weapons of mass destruction are now the well-established international practices, as required by Missile Technology Control Regime (hereinafter MTCR) and International Code of Conduct against Ballistic Missile Proliferation (hereinafter HCOC). Although not being a member of either MTCR or HCOC until now, China affirms that its non-proliferation mechanism has been brought in line with the international practice, by taking China's national conditions into consideration.[52] On the other hand, China has long been influenced by export control exercised by certain foreign countries, particularly the U.S. and there are constant efforts by Chinese authority in fighting against unjustified export control for its own interest.[53]

Obviously, export control of missiles and missile technologies is not a simple trade issue but a highly political one. President Obama's recent move in loosening missile technology export to China has raised concerns that China's missile capacity's increase will bring harm to American's interests in national security.[54] Taking into consideration the current global political context, it is in China's own interest that a transparent, reliable and operational legal framework should be fully established, in order to regulate China's trade activities in accordance with the wide-accepted international practices. In fact, China has demonstrated its policy orientation in conforming to international non-proliferation practices: it has officially submitted its

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51 Major Ronald L. Spencer, Jr., *State Supervision of Space Activity* 63 A.F. L. REV. 75, 89-90 (2009).

52 Hu Qian, *Chinese Practice in Public International Law: 2002* 2 CHINESE J. INT'L L. 667, 675 (2003).

53 When U.S. President Obama visited Beijing in November 2009, Chinese Prime Minister Wen Jiabao addressed that the adjustment of American export control regime will beneficial to both sides and hoped Obama to take concrete measure in this regard. *See* Ou Ye, *Wen Jiabao: Hoping U.S. to Modify Their Export Policy to China (Wen Jiabao: xiwang meiguo gaibian duihua chukou zhengce)* XINHUA'S NEWS REPORT (November 19, 2009), http://www.chinadaily.com.cn/hqcj/2009-11/19/content_9001604.htm.

54 Bill Gertz, *Exclusive: Obama Loosens Missiles Technology Control to China* THE WASHINGTON TIMES (October 15, 2009), http://www.washingtontimes.com/news/2009/oct/15/inside-the-ring-2059116.

application for membership of the MTCR and engaged in dialogues with the Wassenaar Arrangement.[55] Despite China's promising and cooperative approach, there are still doubts about China's missiles export control measures compliance with international standards. The question relates not only to the details of the regulatory measures but also to their implementation in the practice.

A. China's Export Control Regime

China's Foreign Trade Law, revised in 2004, lays down the legal basis of the export control regime concerning arms and defense articles by Article 17, according to which the state may, for the purpose of defending state security, take any necessary measures for managing the import and export of any nuclear materials, weapon, ammunition, or any other military supply. Moreover, when in war or for keeping international peace and security, the state may take any necessary measures in terms of the import or export of goods or technology. More details about export control regime could be found in relevant state policies, the State Council's decisions and orders as well as a multitude of internal management rules and regulations issued by state authorities. As far as missiles export is concerned, military space legislation plays a more important role, given that Chinese space legislation can be divided into civilian and military space legislation.[56]

Firstly, the Regulations of People's Republic of China on the Administration of Arms Export (hereinafter Arms Export Regulations 2002), jointly promulgated by the State Council and the Central Military Commission on October 22, 1997 and entered into force on January 1, 1998 and amended on October 15, 2002, are the legal text of general nature on arms control. The Arms Export Regulations define arms export as export for trade of equipment, special production facilities and other materials, technology and related services which are used for military purposes.[57] In the year of 2002, the former COSTIND (replaced by the Ministry of Industry and Information Technology

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55 State Council Information Office of the P.R.C., *China's Endeavors for Arms Control, Disarmament and Non-proliferation* (September 1, 2005), http://www.fmprc.gov.cn/eng/zxxx/t209613.htm.

56 *Supra* note 12, at 102.

57 Arms Export Regulations, art. 2.

from July 2008) and the People's Liberation Army General Armament Department (hereinafter General Armament Department) jointly published the Arms Export Administration List which includes rockets, missiles, military satellite and their subsidiary equipments.[58] Two important mechanisms are established by the Arms Export Regulations for realising its objectives: the governmental approval on arms trade company's export right and arms export license. As a result, without special approval given by arms export department of the State – in fact, the power is jointly exercised by the former COSTIND and the General Armament Department – no company could engage in arms export.[59] Export license aims at supervising and controlling arms export on a case-to-case basis:[60] even the arms trade companies having been conferred trade right through governmental approval shall still apply for export license on every export project. However, the Arms Export Regulations 2002 do not make clear the conditions under which export licenses shall be issued.

Secondly, on August 22, 2002, the State Council promulgated the Regulations of the People's Republic of China on Export Control of Missiles and Missile-Related Items (hereinafter Missiles Export Control Regulations 2002) and Technologies and the corresponding Export Control List of the Missile and Missile-Related Items and Technologies (hereinafter Missiles Control List). The scope of application of the Missiles Export Control Regulations 2002 is restricted to the export for trade of missiles and missile-related equipment, materials and technologies listed in Missiles Control List, and the gift to, exhibition in, scientific and technological cooperation with, assistance to, provision of service for as such and other forms of technological transfer thereof to foreign countries and regions.[61]

The Missiles Control List is divided into two parts. Part I includes missiles and other delivery systems (including ballistic missiles, cruise missiles, rockets and unmanned air vehicles) as well as their specially designed items and technologies. Item 1 of Part I defines the scope of missiles that are subjected to export control, which includes complete ballistic missiles, space

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58 *See* Missiles and Missile-related Items and Technologies Export Control List, Part VIII.

59 Arms Export Regulations, art. 8.

60 Arms Export Regulations, art. 13.

61 Missiles Export Control Regulations 2002, art. 2.

launch vehicles, sounding rockets, cruise missile and unmanned air vehicles that can be used to deliver at least a 500 kg payload to a range of at least 300 km as well as the specially designed production facilities therefore. Part II of the Missiles Export Control List includes items and technologies related to Item 1 of Part II. The Missiles Export Control Regulations 2002 distinguishes missiles and missiles-related items and technologies of military purpose from other missiles, missiles-related items and technologies with regard to the application of export license. Missiles and missiles-related items and technologies of military purpose shall still be subjected to Arms Export Regulations 2002, consequently, the export licenses of which could only be issued by former COSTIND (now the Ministry of Industry and Information Technology) and General Armament Department; by contrast, the export of missiles, missiles-related items and technologies other than of military purpose is governed by the Missiles Export Control Regulations 2002,[62] the Article 10 of which provides that competent department of the State Council on foreign economic and trade affairs, i.e., the Ministry of Commerce, receives the applications for export license and decides whether or not to issue such licenses.[63] In other words, the missiles export licenses are governed by different state organs depending on the military or non-military nature of the missiles to be exported. Furthermore, there is an important difference between the Arms Export Regulations 2002 and the Missiles Export Control Regulations 2002 with regard to the "control" of exporters: Arms Export Regulations 2002 provides for governmental approval on trade right in arms export, while the Missiles Export Control Regulations 2002 requires a registration procedure,[64] according to which exporters shall register themselves with the Ministry of Commerce and without such registration, no unit or individual shall export missile-related items and technologies.[65]

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62 Missiles Export Control Regulations 2002, art. 5.

63 For detailed provisions on the issuance of export licenses, see, Administrative Measures for the General License for the Export of Duel-purpose Items and Technologies, adopted jointly by the MOFCOM and the General Administration of Custom of the People's Republic of China on December 31, 2005 and entered into force on January 1, 2006.

64 Detailed provisions on the registration procedure are contained in the Measures of the People's Republic of China for the Administration of the Export Registration of Sensitive Items and Technologies, Order No.35, issued by the former MOFTEC (replaced by MOFCOM in 2003) on November 11, 2002.

65 Missiles Export Control Regulations 2002, art. 7.

It is worth pointing out that under Chinese law, governmental approval is much stricter than registration, given that competent government organs exercise a discretionary power in deciding whether or not to give approval when examining the substantial conditions to be met by exporters concerned, while registration is simply a procedural requirement. One may deduce that missiles and related items and technology of non-military purposes would be easier to be exported than those of military purposes. Nevertheless, it shall be emphasized that both Arms Export Regulations 2002 and Missiles Export Control Regulations 2002 require competent governmental organs for issuing export license to refer export license application to State Council and Central Military Commission who will make special authorizations thereon, where the export entails important impacts on national security and social and public interests.[66] Therefore, the strictness of governmental control over missiles and missiles-related items and technologies is variable in different situations. Another difference between Arms Export Regulations 2002 and Missiles Export Control Regulations 2002 lies in the fact that individuals are not permitted to engage in arms export,[67] whereas such prohibition does not appear in the Missiles Export Control Regulations 2002 as far as the export of missiles, missiles-related items and technologies of non-military purposes is concerned.

In 2006, China made an important reform which unifies the existing export licenses regimes through the promulgation of Regulatory Measures on the Import and Export Licenses of Dual-usage Items and Technologies (hereinafter Dual-usage Items and Technologies Licenses Measures 2006) and its annexure, the Import and Export Licenses of Dual-usage Items and Technologies List. As a matter of fact, import and export license requirement are separately provided for by a multiple of administrative regulations, including the Regulations on Nuclear Export Control promulgated by the State Council in 1997 and amended in 2006; Regulations on Export Control of Dual-Use Nuclear Goods and Related Technologies promulgated by the State Council in 1998 and amended in 2007; Regulations on Export Control of Dual-use Biological Agents and Related Equipment and Technologies promulgated by the State Council in 2002; Regulations on Monitored and Controlled Chemicals promulgated by the State

66 Arms Export Regulations 2002, art. 16; Missiles Export Control Regulations 2002, art. 11.

67 Arms Export Regulations 2002, art. 20.

Council in 1995; Regulations for Administration of Precursors and Chemicals used in Production of Narcotic Drugs and Psychotropic Substances promulgated by the State Council in 2005; Measures on Export Control of Certain Chemicals and Related Equipment and Technologies jointly issued by Ministry of Foreign Trade and Economic Cooperation (the now Ministry of Commerce), the former State Economic and Trade Commission (dissolved in 2003 by decision of State Council) and the General Administration of Custom in 2002; and the Missiles Export Control Regulations 2002. The Dual-usage Items and Technologies Licenses Measures 2006 integrates all the abovementioned import and export licenses regimes into one single official document, while clarifying that the MOFCOM is the competent governmental organ in dealing with license issues, which include the making of relevant administrative rules and measures, the supervision and control over the enforcement of those administrative rules and measures, as well as the punishment of violations.[68] As one of the conditions for the issuance of licenses, the Dual-usage Items and Technologies Licenses Measures 2006 requires that prior to the submission of application for license, an applicant shall have already obtained authorization on its import or export project from the competent government organ to which the applicant is subordinate.[69] As a consequence, the MOFCOM will restrict itself in effectuating a formal examination when deciding whether or not to issue the license, because the substantial control over import or export is exercised by competent governmental organs through authorization procedure. In one way or another, the Dual-usage Items and Technologies Licenses Measures 2006 do not aim to bring a substantial change to the current export control regimes, including that of the missiles and related items and technologies. However, from a procedural point of view, they do help to make the import and export transactions more transparent than ever.

B. Is China's Export Control Conform to International Non-Proliferation Practices?

Chinese government considers non-proliferation export control as one of the issues relating to its efforts in arms control, disarmament and non-proliferation. It argues that China's legislation on export control widely

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68 Dual-usage Items and Technologies Licenses Measures 2006, art. 3.

69 Dual-usage Items and Technologies Licenses Measures 2006, art. 11.

embraces such international practices as licensing system, end-user and end-use certification, list control and "catch-all" provisions; all regulations spell out in detail the penalty measures for illegal exports. Moreover, the scope of control of the aforementioned regulations is basically identical with international practices. Particularly, China's missile list also by and large conforms with the annex to the MTCR.[70] However, there are different opinions on the conformity of China's export control regime to international non-proliferation practices. For example, some authors have identified a few potentially significant omissions and differences with the MTCR Annex text.[71] This article will not give comments on it, considering that the issue involves practically more technical than legal problems. Nevertheless, there is no doubt that the effectiveness of the regulations and control list in preventing proliferation of ballistic missiles and missile technology will ultimately depend on enforcement for every export and potential export country.[72] Probably, more divergences would arise on the question of whether or not China has faithfully enforced its missile export control measures in assessing its compliance with international standards.

The compliance assessment will be hard to be made. In absence of an operable international regime under which Member States' performance is assessed in an objective manner, the effective enforcement of domestic regulations on missiles and missile technology export relies mainly on goodwill and cost and benefit considerations of each sovereign state. China could not be an exception to that "common practice". However, China's particular status as a rising powerful state makes its approach and behaviour in the field of export control especially sensitive to the international community's security concern. For example, in order to demonstrate its determination in rigorously reinforcing the domestic export control regime, China has indicated that the Chinese government has dealt with scores of

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70 *Supra* note 55.

71 *See* Phillip Saunders, *Preliminary Analysis of Chinese Missile Technology Export Control List* (September 6, 2002), http://cns.miis.edu/programs/eanp/pdfs/prc_msl.pdf.

72 *See* Jonathan E. Davis, *Export Controls in the People's Republic of China* Athens, GA: Center for International Trade and Security, The University of Georgia (2005). Cited from: Jing-dong Yuan, Testimony before the USCC (July 12, 2007), http://www.uscc.gov/pressreleases/2007/testimony/Yuan.pdf.

cases of various types concerning illegal export of sensitive items and technologies since the end of 2002, that competent authorities have put the companies involved in these cases on a "watch list" so as to prevent the recurrence of similar activities.[73]

Despite that announcement, U.S. policymakers have often voiced worry over China's transfers of missile components and related technology to nations of concern, most notably to Iran, and Pakistan. Although China has expressed its intention in joining the MTCR, a number of MTCR member states, most notably the U.S., has blocked China's entry into the suppliers regime. Washington's hesitation to admit China to the MTCR stems from anxiety about Beijing's unwillingness or inability to fully enforce their domestic laws. Between 2002 and 2007, the U.S. State Department issued sanctions on numerous Chinese companies on over a dozen occasions. Although few details are publicly released as to the nature of the transfer that was the impetus of the punishment, a number of the sanctions were reportedly brought about by alleged transfers of missile-related items to Iran.[74] The above fact shows that China's enforcement of its regulations on export control is a crucial aspect in evaluating the conformity issue.

Some optimist opinions argue that even if China has not yet formally taken part in international non-proliferation regimes, it practically adheres to the principle of non-proliferation through domestic measures.[75] It is true that China shows respect to non-proliferation as a principle. However, no state can claim that its legal regime on export control and non-proliferation is perfect. If China wants to further the implementation of its commitments, a closer analysis on the details of its governmental regulations would be preferable for rendering China's law enforcement measures even more compatible with international practices, which can in turn enhance China's status as a trustworthy and responsible big power. In this regard, some elements of the current legal arrangements are worthy of attention. For

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73 *Supra* note 54.

74 NTI, "China Profile: Missile Overview", http://www.nti.org/e_research/profiles/China/Missile/index.html.

75 *See e.g.* Wang Wei, *Effects of International Institutions on Non-member States (Guoji zhidu dui feichengyuanguo de zuoyong)* 8 INT'L REV. (GUOJI GUANCHA) 70-72 (2009).

example, the export license requirement seems to play a pivotal role in export control; however, the mechanism through which export license is issued has some serious problems that cannot be neglected. Firstly, Article 5 of the Dual-usage Items and Technologies Licenses Measures 2006 establishes in fact a localised export license issuance system by conferring the decision-making power over the issuance of export licenses on the Bureau of license subordinated to the MOFCOM and the license agencies of provincial level. Correspondingly, the MOFCOM performs the function of supervising, guiding and eventually punishing violations relating to export license measures. In other words, the MOFCOM rarely exercises a direct control over missiles and missile technology export. Secondly, application for export licenses is based on the exporter's initiative, i.e., only when exporters are aware or shall be aware of the risk of its merchandises for export shall they apply for licenses. Following the above arrangements, the customs department becomes practically the "last line of defense" in preventing regulated items from being exported. Among the state organs in charge of export control, the General Administration of Customs is responsible for supervision and control of the export of the items and technologies under regulation, and it also participates in investigating and handling cases of illegal exports. Customs has the authority to question whether the items from exporters are sensitive items and technologies, and to request the exporters to follow regulations and apply to competent government departments either for export license or for relevant certificates to show that the exports are not controlled items.[76]

To a large extent, the effectiveness of export licensing in controlling the missiles and missile technology export depends not only on the law enforcement capacity of Chinese Customs, but also on exporters' legal consciousness, which is difficult to manage in a predictable manner – especially when the Missiles and Missile-related Items and Technologies Export Control List itself needs to be frequently interpreted due to fast technological development. Chinese government confessed that it had made efforts in raising exporters' consciousness on non-proliferation through special education and training programmes, considering self-discipline as important as

[76] Dual-usage Items and Technologies Licenses Measures 2006, art. 9.

governmental intervention in order to effectively implement its export control regulations.[77] Furthermore, Article 11 of the Dual-usage Items and Technologies Licenses Measures 2006 provides that exporters shall have obtained approval of competent governmental agencies to which they are subordinated, before submitting its application for export license. It means that governmental approval is a prerequisite to the issuance of export license. As far as missiles and missile technology is concerned, governmental approval shall be given by the Ministry of Industry and Information Technology. In putting up governmental approval as a prerequisite to the issuance of export license, the Dual-usage Items and Technologies Licenses Measures 2006 subject export to governmental approval instead of license requirement. In other words, once export has been approved by the competent government agency, the MOFCOM and its subordinate organs have little power to refuse the issuance of a license. In other words, governmental approval plays more or less a "valve" role on export, while export license formally endorses the approval decision. It is hard to say that export license mechanism could have any substantial contribution to effectuate China's engagements in non-proliferation. As a matter of fact, the effectiveness of export control on missiles and missile technologies depends on governmental approval instead of export license.

Given the importance of governmental approval with regard to export license, effective export control is closely linked to the question of whether or not governmental approval is governed by any transparent and operational legal rules, which conform to international practices. The answer is however in the negative. In fact, the existing administrative regulations and measures relating to export control say almost nothing on the precise conditions under which competent government agencies shall or shall not give approval in concrete cases. As a result, competent agencies enjoy a large margin of appreciation in approving export applications. Due to its discretionary character, the governmental approval mechanism lacks transparency and predictability in the eyes of export applicant. The opacity of the conditions on governmental approval can be partially explained by the export's political implications. A government agency shall pay due attention to the political impact of the export to be approved. Correlatively, governmental approval involves more political than legal issues. That is particularly true of the missiles

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77 The Ministry of Foreign Affairs of the P.R.C., *China's Foreign Affairs 2009* 294 (2009).

and missile technology export which is always a sensitive element in China's foreign relations.[78] There is a long and unveiled tradition of China's law-makers in adopting general legal norms which permit political considerations to be appropriately and sufficiently taken into account by executive bodies in the law implementation stage. Regulatory measures on missiles and missile technologies export control reflect the same approach. It is hard to verify, from the mere written rules, whether or not the competent government agency has fully enforced the regulatory measures in accordance with international standards of non-proliferation. It seems that China's compliance issues would continue to be rhetoric in the long run. However, some exterior elements beyond written rules have some more important influence on China's performance in honouring its engagements of non-proliferation.

C. Exterior Constraints Influencing China's Performance in Non-Proliferation

By exterior constraints, the authors of this article mean the political and legal elements beyond China's domestic law that could make China further implement its own regulations. In this regard, China could be driven by "informal sanctions" such as moral peer pressure and other forms of political lobbies to strengthen the enforcement of its domestic law and regulations in order to assure stricter compliance with international practices[79]. Compared with moral and political elements, economic considerations play a rather practical function in driving China to comply with international standards. The China-U.S. launch service trade experience shows that security concerns for non-proliferation were one of the major impediments to the market access by Chinese launch service providers.[80] Although some contending opinions

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78 A recent example of the political repercussion of missile export is linked to the Pakistan's experiment in ballistic missile. Some commentators argued China had contributed to Pakistan's missiles development. China's official internet media Xinhua has reported the event. The news report titled in Chinese *The U.S. Claims that Pakistan's Experimented Ballistic Missiles are Re-Constructed on Chinese Dong-feng Series Missiles*, http://news.xinhuanet.com/mil/2010-05/13/content_13483009.htm.

79 *See e.g.* Robert C. Bird, *Procedural Challenges to Environmental Regulation of Space Debris* 40 AM. BUS. L.J. 635, 648 (2003).

80 *See* Shirley A. Kan, *China: Possible Missile Technology Transfers from U.S. Satellite Export Policy –Action and Chronology* CONGRESSIONAL RESEARCH SERVICE REPORT FOR CONGRESS (September 5, 2001), http://www.fas.org/spp/starwars/crs/98-485.pdf.

insist that the implementation of MTCR by U.S. violates the Outer Space Treaty by defying free access to outer space and introducing discriminatory treatment between space faring and non space faring countries;[81] China has nonetheless never insisted on the contending position. It is also important to point out that the U.S. has a long term objective in harmonizing China's export system with existing multilateral export control regimes and has been finding ways to enhance the Chinese government's ability to implement its existing export control regulations.[82] In some cases, the U.S. efforts could have produced some direct or indirect impact on China, in view of conducing to stricter compliance with international non-proliferation standards. For example, the U.S. has successfully persuaded Korea to cancel its launch contract with China in 2001, advising that China is not a member of the MTCR.[83] With more and more cases, arise issues about security concerns becoming a constraint on China's foreign economic relations' development – i.e., when China's import and export is hindered for security reasons,[84] Chinese government will be more motivated to implement its own non-proliferation regulatory measures in order to reassure the international community. Furthermore, China's expanding influence on regional level through the founding and functioning of Asia Pacific Space Cooperation Organization (APSCO) in 2005 will raise concerns in the international community over China's role within the organization, the peaceful purpose of its activities being reaffirmed ever since.[85] Similarly, China's performance in non-proliferation will also have important implications on the realization of its ambition as a leading member of the APSCO.

Although China shows willingness to bring itself closer to international practices of non-proliferation for pragmatic reasons, the political aspect of export control could make the gap-narrowing process always burdensome.

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81 Barry J. Hurewitz, *Non-proliferation and Free Access to Outer Space: the Dual-use Dilemma of Outer Space Treaty and the Missile Technology Control Regime* 9 HIGH TECH. L.J. 211, 232 (1994).

82 Jing-dong Yuan, *Strengthening China's Export Control System* CNS PAPER (October 4, 2002), http://cns.miis.edu/reports/pdfs/jdmemo.pdf.

83 Sang-Myon Rhee, *Current Status and Recent Developments in Korea's National Space Laws* 35(2) J. SPACE L. 525 (2009).

84 *See e.g.* Xin Zhiming, *India Bans Chinese Telecom Equipment* CHINA DAILY 13 (2010).

85 Haifeng Zhao, *Current Legal Status and Recent Developments of APSCO and Its Relevance to Pacific Rim Space Law and Activities* 35(2) J. SPACE L. 559-598 (2009).

For example, the potential for diversion of dual-use space technologies has resulted in a strict and cautious American interpretation of the MTCR in early 1990s. Because of the dual-use problem and the perceived difficulties in ascertaining the intentions of potential recipient states, the U.S. would not export equipment and technology for space launch vehicles to countries with ballistic missile programs. This approach ignored the end-use of the transferred technology purported by the MTCR.[86] At the beginning of the twenty-first century, U.S. continued to regard China as one of the sensitive countries and exercise volatile controls including substantial curtailment of high-tech transfers to China, particularly satellites.[87] U.S. conservative approach in export control and its results on the U.S. trade practices have led to China's contests;[88] however, once China could get a similar product and technology from a third country, the U.S. pressure could no longer be efficient. In fact, China is aware of the fact that "the Achilles heel to security arrangements of MTCR is that implementation and enforcement is left to member states' discretion".[89] Not being a member state to the MTCR, China would certainly retain some flexibility in enforcing its domestic regulatory measures in cases where exterior constraints no longer work. As a result, it is hard to say that U.S. supervision is always decisive in forcing China to comply with international standards, although they do have a strong influence on the formation of international practices on export control. A further step should be made beyond the pragmatic curtailment pressure in order to build a solid consensus on how to balance on one hand the liberal trade in the field of outer space activities and the non-proliferation issues on the other. However, whenever national security concern is involved, political consensus is always difficult to be reached. For example, both China and India refrain from subscribing the HCOC – which is not a space law instruction but a political declaration and intended to supplement the MTCR – and the U.S. has

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86 *See* Hurewitz, *supra* note 81, at 228.

87 Christopher F. Corr, *The Wall Still Stands! Complying with Export Controls on Technology Transfers in the Post-Cold War, Post 9/11 Era* 25 HOUS. J. INT'L L. 441, 506-07 (2003).

88 *See e.g.* Quan Xiaoshu, Li Xuanliang, *Chinese Expert Against American Draft New Measures Concerning Export Control Relating to China (Zhongguo zhuanjia fandui meiguo niyizhong de duihua chukou guanzhi xinguiding)* XINHUA'S NEWS REPORT (August 30, 2006), http://military.people.com.cn/GB/42964/57866/4769985.html.

89 Major Ronald L. Spencer, Jr., *State Supervision of Space Activity* 63 A.F. L. REV. *75*, 91 (2009).

postponed taking implementation measures such as supplying pre-launch notifications, consequently, the universal application of HCOC is seriously challenged.[90] The fact that transparency and mutual trust are lacking among space faring countries undermines the effectiveness of international standards on non-proliferation,[91] and consequently, the balance between liberal trade and national security concern relating to space activities.

V. CONCLUSION

Commercial launch services and trade in missiles and missile technology are two prominent commercial aspects of space activities. They reflect the interaction between the two different considerations of liberalization and security. The strategic implications of commercial aspects of space activities make it inappropriate to analyse them simply in light of normal legal matrix on trade practices. Launch service trade and import and export of missiles and missile technology are significantly subjected to a certain political context. Policies, rather than legal rules, have a strong – if not decisive – impact on the development of the two commercial aspects of space activities. As much as legal arrangements in the field of space activity are more often than not a result of the political decision-making, the governmental regulation on commercial aspects of space activities can be characterised as a substantially policy-driven process. The interaction between China's domestic governmental regulation on one side and foreign and international regulatory measures on the other demonstrates that the policy-driven character prevails on both domestic and international fronts.

Although politics plays a prominent role in regulating commercial aspects of space activities, legal rules are not just a mask of political manoeuvre. Law does have independent and instrumental functions: the balance between

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90 Scott C. Larrimore, *International Space Launch Notification and Data Exchange* 23(3) SPACE POL'Y 176 (2007).

91 For example, in July of 2005, the United States and India announced their cooperative agreement on nuclear proliferation. Policy analysts see this development as a realpolitik move by the United States in balancing an increasingly competitive China, and U.S.-India agreement stands in stark contradiction to the international interests in non-proliferation, let alone disarmament. *See* Kesav Murthy Wable, *The U.S.-India Strategic Nuclear Partnership: A Debilitating Blow to the Non-Proliferation Regime* 33 BROOK. J. INT'L L. 719, 719, 724 (2008).

trade liberalization and security concerns relating to space activities is widely accepted as a guiding legal principle; the transparent and predictable enforcement of relevant domestic legal rules is referred to in assessing a state's compliance with international practices of non-proliferation; last but not the least, even if political impact can not be excluded, fair and equitable procedural rules lays down the minimum barrier that restricts the discretion and prevents the governmental regulation from being misused. As far as China is concerned, the implementation of those rules will be far more crucial than just promulgating law and regulations.

On the international level, current development of the legal framework on commercial launch services and trade in missiles and missile technology has left behind practices. States are far more autonomous in adopting their own governmental regulatory measures than in other trade fields. The fact can only lead to a downturn spiral of interest conflicts and mutual distrust with the further development of commercial aspects of space activities. States, particularly space faring states, shall make efforts in forging a multilateral legal system capable of striking an effective balance between liberalized commercial space activities and international security. China's rising status in space exploration, with its active involvement in commercial aspects of space activities, makes it possible to take voluntary initiative on the issue.

Economic Governance and Space Law: Emerging Foundations for Development of "Common Pool Resources" in Outer Space

Valnora Leister[1]

ABSTRACT

As commercial space faring capabilities spread, a need is growing for new approaches to safeguard the common interests of humanity in space. The 1967 Outer Space Treaty declares in its opening article that, "exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of Mankind". However, to date, little has been done to develop outer space for the benefit of humanity. So far, space has been explored mainly by developed nations, acting to foster their economic and military interests in the new frontier. Based upon their interests, these countries at present restrict access to and transfer of space technologies, despite moves backed by emerging economies to liberalize trade barriers. This article examines the concept of "province of mankind" in view of recent developments in environmental law, and seeks to apply to outer space the keys to successful development of "common pool" resources, as proposed by Nobel Laureate Elinor Ostrom in her book "Governing the Commons: The Evolution of Institutions for the Collective Action".

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CONTENTS

I. INTRODUCTION

In recent years, the world has seen a shift in political and economic power, creating tensions in the international system. One major concern is over the future of outer space: should access to this realm be shaped by national military considerations?

This article explores opportunities for the traditional legal foundations of international space law to evolve in ways that lead to greater accountability in the management of common resources for the benefit of humanity. First, the article considers the evolution of the concept of "the commons" under international law as areas not subject to the national jurisdiction of states and the guidelines established to govern Antarctica, the high-seas, the seabed and outer space. Secondly, it examines the major national security constraints preventing the use of outer space for the benefit of mankind. A look at the principles regarding environment and the role of non-governmental organizations (NGOs) reveals the introduction of new tools for governance, requiring transparency and accountability from states in the management of "the global environment". Lastly, this article will explore practical innovations for economic governance, as developed by Nobel Laureate Elinor Ostrom,

for management of "Common Pool Resources (CPR)" in outer space. Her theories may open paths for realization of the ideal that outer space activities should be carried out for the benefit of Humanity.

II. THE GLOBAL COMMONS: ANTARCTICA, HIGH-SEAS, SEABED AND OUTER SPACE

In the present legal system, the state is the primary subject and object of public international law. In order for the state to have legal personality, it must meet four simple tests – it must hold a territory, have a population, include a political structure for government and have the capacity to enter into relations with other states.[2] According to traditional positivist doctrine, only states have rights and obligations under public international law. The validity and authority of international law depends upon the voluntary participation of states in its formulation, observance, and enforcement.

Areas that are not part of a state's territory and jurisdiction are defined as "*res communis*" also known as "Commons," "Common Heritage of Mankind,"[3] or "Province of Mankind".[4] The principle of the common heritage of humankind (CHM) envisages that all human beings have a stake in resources outside the sovereign territory of states. Such areas are subject to treaties negotiated between nation states. These agreements reflect a shared aim of holding the resources in trust for future generations, and a corresponding desire to prevent monopolization by individual nation states or corporations.[5]

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[2] The territory is the geographical area subject to the sovereign entity (its soil, subsoil, interior waters, territorial sea and aerial space). According to art. 1 of Montevideo Convention on the Rights and Duties of States, Dec. 26, 1934, (1936) 165 L.N.T.S. 19 , "[t]he state as a person of international law should possess the following qualifications: (a) permanent population; (b) a defined territory; (c) government; and (d) capacity to enter into relations with other states". This Convention is the best-known formula for setting out the basic characteristics of statehood. The United States and fifteen Latin American states are parties to it. Despite the small number, it is seen as reflecting the classical conditions under customary international law that a prospective state must satisfy.

[3] The spaces that were considered *res nullius* in traditional International law, are now considered "common heritage of mankind" in the post- modern International law: PAULO BORBA CASELLA, DIREITO INTERNATIOCIONAL DOS ESPACOS 564 (2009).

[4] The Law of the Sea Convention and the Moon Treaty refer to the areas considered "Common Heritage of Mankind" whereas the Outer Space Treaty refers to outer space as "Province of Mankind."

[5] KERNEL BASLAR, THE CONCEPT OF COMMON HERITAGE OF MANKIND IN INTERNATIONAL LAW 13 (1998).

A look at how international law has attempted to politically manage these domains – Antarctica, the high-seas, the seabed and outer space – provides a context for evaluating parallel attempts to govern the "commons" of outer space for the benefit of humankind.

A. Antarctica

The 1959 Antarctica Treaty recognizes a common interest of humanity in maintaining Antarctica as a peaceful area. The treaty established the continent as being beyond national jurisdiction and sovereignty and prohibited military activities, including basing of nuclear weapons.[6] According to its Article 1, "Antarctic shall be used for peaceful uses only,"[7] but scientific research and logistical problems led to a high degree of involvement of armed forces, raising fears of military activities. The 1959 Treaty was complemented by the Wellington Protocol of 1988, which proposed international regulation of mineral resources in Antarctica. After opposition from developed countries blocked this proposal, the Madrid Protocol of 1991 to protect biodiversity was passed,[8] with backing by leading nations including China, the U.K. and the U.S.

B. High Seas

In November of 1967, Malta proposed that the new law of the sea should be based no longer on the notion of "freedom of the seas" but on a new concept, the CHM.[9] The CHM concept was thereafter given legal status in the 1982

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6 The centerpiece of this regime is the Antarctic Treaty, which functions legally and politically as the authoritative nucleus for overseeing Antarctic activities. Since its entry into force in 1961, the Antarctic Treaty has expanded in membership from twelve original parties to thirty-nine in early 1989. Of these parties, the designated group of decision makers – the Antarctic Treaty Consultative Parties (ATCPs) – has increased from the original twelve to twenty-two today. Seven of these states – Argentina, Australia, Chile, France, New Zealand, Norway and the United Kingdom – assert claims to pie-shaped portions of territory on the continent. All ATCP states meet biennially to recommend policy for the Antarctic.

7 *See* GILLIAN D TRIGGS, THE ANTARCTIC TREATY REGIME, LAW, ENVIRONMENT AND RESOURCES (2009).

8 It came into force in 1998, with the effect of protecting Antarctica for 50 years from commercial exploitation of its mineral wealth.

9 E.M. Borgese, *Expanding the Common Heritage of Mankind*, *in* GLOBAL PLANNING AND RESOURCE MANAGEMENT (A. Dolman ed., 1980).

Law of the Sea Convention (LOSC), which entered into force November 1994, after being signed by 159 countries (the U.S. signed but has not yet ratified this convention). Under the law of the sea, the high seas are defined as, "all parts of the sea that are not included in the exclusive economic zone, in the territorial sea or in the internal waters of a State, or in the archipelagic waters of an archipelagic state" (art.86).[10] In general, the high seas are open to all states. The flag state has the exclusive right to exercise jurisdiction over its vessels on the high seas. Like outer space, the high seas and sea-bed are to "be reserved for peaceful purposes" (art.88). The term "peaceful purposes" has been interpreted as "non-aggressive" purposes and therefore national military uses of the high seas, like in outer space, have been allowed. The major maritime nations have claimed the right to use areas of the high seas for military activities such as the testing of missiles and nuclear weapons. When these activities occur, a 'warning' zone is typically declared and mariners are advised to stay clear. Sometimes 'safety' or 'exclusion' zones are established, and other vessels are explicitly barred from entry.[11]

C. Seabed

In 1970, the UN General Assembly adopted Resolution 2749 declaring the CHM as the prime principle governing the exploitation of the international seabed. The international seabed area is defined as an area consisting of the "seabed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction." The LOSC recognizes the seabed as a "commons" with rich minerals, which include baseball-size nodules lying on the seabed floor formed by processes of accretion and containing cobalt, copper, iron, manganese and nickel. Developing countries moved that exploration of the sea-bed should be managed by a Seabed Authority. Participating private entities would be taxed and the profits distributed to all states. Moreover, the Seabed Authority, an inter-governmental body, itself would engage in mining through the establishment of a new entity, called the "Enterprise". A 1994 agreement on Part XI of the Convention agreed on a modified Seabed Authority. The Enterprise was to begin operations only upon a decision from the Seabed

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10 THOMAS BUERGENTHAL & SEAN D. MURPHY, PUBLIC INTERNATIONAL LAW IN A NUTSHELL 283 (4th ed., 2007).

11 *See* Jon M. Van Dyke, *Military Exclusion and Warning Zones on the High Seas* 15(3) MARINE POL'Y 147 (1991).

Authority and it would be required to conduct its initial mining operations through joint ventures rather than operate independently.[12] This system has not yet been fully implemented, since the consensus has been that economic mining of the ocean depths might be decades away. Moreover, the United States, with some of the most advanced ocean technology in the world, has not yet ratified the LOSC and is thus not a member of the Authority.[13]

D. Outer Space

The body of international space law comprises five treaties and five declarations of legal principles applying to outer space.[14] International legal principles in the treaties cover non-appropriation of outer space by any one

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12 *Report of the ISBA*, April 14, 2008, Doc ISBA/14/2. In recent years, interest in deep-sea mining, especially with regard to ferromanganese crusts and polymetallic sulphides, has picked up among several firms now operating in waters within the national zones of Papua New Guinea, Fiji and Tonga. Papua New Guinea was the first country in the world to grant commercial exploration licenses for seafloor massive sulfide deposits when it granted the initial license to Nautilus Minerals in 1997. Japan's new ocean policy emphasizes the need to develop methane hydrate and hydrothermal deposits within Japan's exclusive economic zone and calls for the commercialization of these resources within the next 10 years. Reporting on these developments in his annual report to the Authority in April 2008, Secretary-General Nandan referred also to the upward trend in demand and prices for cobalt, copper, nickel and manganese, the main metals that would be derived from seabed mining, and he noted that technologies being developed for offshore extraction could be adapted for deep sea mining.

13 E.M. BORGESE, OCEAN MINING AND THE FUTURE OF WORLD ORDER (1990).

14 The Five Treaties are:

Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*", adopted by the General Assembly in its* Resolution 2222 (XXI*), opened for signature on 27 January 1967, entered into force on 10 October 1967, with 98 ratifications and 27 signatures as of 1 January 2008).*

The Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space *(the "Rescue Agreement", adopted by the General Assembly in its* resolution 2345 (XXII)*), opened for signature on 22 April 1968, entered into force on 3 December 1968, 90 ratifications, 24 signatures, and one acceptance of rights and obligations (as of 1 January 2008).*

The Convention on International Liability for Damage Caused by Space Objects *(the "Liability Convention", adopted by the General Assembly in its* resolution 2777 (XXVI)*), opened for signature on 29 March 1972, entered into force on 1 September 1972, 86 ratifications, 24 signatures, and three acceptances of rights and obligations (as of 1 January 2008).*

The Convention on Registration of Objects Launched into Outer Space *(the "Registration Convention", adopted by the General Assembly in its* resolution 3235 (XXIX)*), opened for signature on 14 January 1975, entered into force on 15 September 1976, 51 ratifications, 4 signatures, and 2 acceptances of rights and obligations (as of 1 January 2008).*

country, arms control, the freedom of exploration, liability for damage caused by space objects, the safety and rescue of spacecraft and astronauts, the prevention of harmful interference with space activities and the environment, the notification and registration of space activities, scientific investigation, the exploitation of natural resources in outer space and the settlement of disputes. Each of the treaties recognizes that the domain of outer space - including the activities carried out there, and whatever benefits might accrue from them - should be devoted to enhancing the well-being of all countries and humankind. Each agreement seeks to promote international cooperation in outer space activities.

Article 1 of the 1967 Space Treaty defines outer space as "the province of Mankind", whereas the Moon Treaty in its article 11 declares that the Moon and its natural resources are CHM, undertaking to establish and international regime to govern the exploitation of its natural resources, which to date has not been created.

As with other CHM areas such as the high-seas, military activities are also taking place in outer space. In interpreting the guidelines and principles applied to outer space, leading space powers during and after the Cold War have concluded that outer space can be used for "non-aggressive" military purposes.[15]

The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies *(the "Moon Agreement", adopted by the General Assembly in its* resolution 34/68*), opened for signature on 18 December 1979, entered into force on 11 July 1984, 13 ratifications and four signatures (as of 1 January 2008).*

The Five Declarations on Legal Principles are:

The Declaration of Legal Principles Governing the Activities of States in the Exploration and Uses of Outer Space (General Assembly resolution 1962 (XVIII) of 13 December 1963); The Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting (resolution 37/92 of 10 December 1982); The Principles Relating to Remote Sensing of the Earth from Outer Space (resolution 41/65 of 3 December 1986);

The Principles Relevant to the Use of Nuclear Power Sources in Outer Space (resolution 47/68 of 14 December 1992);

The Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries (resolution 51/122 of 13 December 1996).

15 Many studies have been written on this topic, see e.g. ISABELLA DIEDERIKS-VERSCHOOR & VLADIMIR KOPAL, AN INTRODUCTION TO SPACE LAW 139 (2008).

Citing the validity of military uses of space so long as they are not agressive, the U.S., Russia and China have deployed a range of remote sensing, communications and other secret space-based systems. The impact of such "non-agressive" secret uses are beginning to be more widely felt. Anti-satellite missile tests by China in 2007 and by the U.S. in 2008 have raised concerns as such use of space can generate large amount of debris and also destroy communications systems dependent on satellites.[16]

The U.N. has recognized an arms race in outer space as an ongoing risk. A draft treaty on the Prevention of an Arms Race in Outer Space proposed by Russia and China was rejected by the U.S. on the ground that an effective and verifiable ban on space-based weapons or earth-based anti-satellite systems (ASAT) would be impossible. The European Union has proposed bilateral consultations towards amending the project and developing a text that would be acceptable by the greatest number of countries possible. Yet the prospects for such measures apparently remain checked by superpower consideration of national interests.[17]

For decades, the prospect of opening space for the benefit of mankind has fired imaginations of people around the world. As a new global commons, it has generated innovative legal thinking on how to foster transnational exploration and development of the frontier. Yet such CMH frameworks have yet to prevail. Access to and uses of outer space have been controlled by few space faring nations, seeking to advance their own military and economic interests.

A key reason for the gap between declared principles and practice consists of technology export controls put in place during the Cold War. Under this framework, the U.S. and the former Soviet Union – joined by their respective political allies, the NATO alliance and the Warsaw Pact – put in place treaties

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16 Valnora Leister & Lalin Kovudhikulrungsri, *Outer Space: Of the People, by the People and for the People*, Presented at the IISL Symposium in Korea (2009).

17 *Experts Urge Reformulation of U.S. Space Policy: American Academy Issues Three White Papers*, EUREKALERT! (July 30, 2009), http://www.eurekalert.org/pub_releases/2009-07/aaoa-eur072909.php. The Reconsidering the Rules of Space project is supported by a generous grant from the Carnegie Corporation of New York.

and national policies to prevent the transfer of space technologies to non-aligned countries.[18]

In 1989, with the fall of the Berlin Wall, the East-West confrontation abated. Yet the Cold War restrictions on transfer of space technologies remained in place. In consequence, the North-South gap persisted with regard to access to space technologies. After the 9/11 terrorist attack on the U.S., export controls became stricter, making it even more difficult for developing countries to obtain technologies for access to space. The State Department by its Directorate of Defense Trade Controls (DDTC) is in charge of enforcing the International Traffic in Arms Regulations (ITAR) and the Export Control Act. Although the Munitions List is subject to change as well as the list of countries whose access to technologies is limited or restricted, the ITAR system as a whole has kept global aerospace companies from responding to partnerships opportunities in emerging economies.[19] A new released U.S. National Policy calls for government to government agreements for sensitive or advanced spacecraft related exports.[20] Another factor limiting emergence of peaceful economic outer space activities for the benefit of mankind has been a lack of transparency. Key aspects of national space programs have been cloaked to avoid scrutiny and citizen participation.

The European Community's (EU) Draft Code of Conduct for Outer Space Activities (December, 2008), has proposed transparency and confidence building measures for civilian, military and commercial uses of space aimed at preventing space from becoming an area of conflict. Yet even these voluntary measures have encountered opposition by powerful space faring countries, such as the U.S.

Regardless of the principles that declare space to be the province of mankind and the Moon and other celestial bodies as CHM, it is clear that unilateral national actions are a key obstacle to realizing this vision. Issues

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18 *Supra* note 15, at 138.

19 The U.S. Government views the sale, export, and re-transfer of defense articles and defense services as an integral part of safeguarding U.S. national security and furthering U.S. foreign policy objectives. The Directorate of Defense Trade Controls (DDTC), in accordance with 22 U.S.C. 2778-2780 of the Arms Export Control Act (AECA) and the International Traffic in Arms Regulations (ITAR) (22 CFR Parts 120-130), is charged with controlling the export and temporary import of defense articles and defense services covered by the United States Munitions List (USML).

20 *US National Space Policy*, June 28, 2010 (White House Press).

such as growing militarization, restrictions on technology transfer, increased space debris and lack of transparency stem from decisions taken to advance national military and economic interests. So far there have been no measures to limit the sphere of state actions in areas outside state sovereignty.

III. A BRIDGE TO NEW GOVERNANCE OF THE COMMONS: ENVIRONMENTAL LAW AND NGOS

International environmental law, a recent branch of international law specializes in the preservation and enhancement of the global ecosystems. It addresses problems such as ozone depletion, climate change, and loss of biological diversity. Countries have developed a network of environmental law treaties as well as organizations, and established legal principles and operational guidelines applying to global environment.[21] The environment, like outer space, transcends national boundaries and environmental law is giving legal standing to the rights and obligations of people directly – rather than exclusively through nation states – in issues relating to the CHM area.

In 1972, at the U.N. Conference for the Human Environment in Stockholm, a total of one hundred and thirteen states attended, as well as dozens of Non-Governmental Organizations (NGOs). Twenty years later, the Conference on Environment and Development in Rio de Janeiro was attended by representatives of one hundred and seventy two countries. At this conference, environmental protection gained recognition as a critical aspect of sustainable development. The principle of citizen participation was endorsed there as a preferred way for countries to deal with environmental issues. Citizen participation was defined to include direct access by individuals and NGOs to global judicial and administrative proceedings affecting the environment. Such citizen engagement has become standard procedure for the environmental projects financed by leading international organizations. In Europe, EU authorities have to place at the disposal of requesting private citizens of member countries any environmental information that they require.[22] The environment and its protection are recognized as a core interest

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21 *Supra* note 10, at 301.

22 E. WEISS, IN FAIRNESS TO FUTURE GENERATION: INTERNATIONAL LAW, COMMON PATRIMONY AND INTER-GENERATIONAL EQUITY (1989).

of every individual, resulting in legal standing for direct access in international proceedings that relate to environmental law.

Globalization of other kinds of technology, such as cyberspace, during this period has given people around the world access to information and the ability to mobilize on issues of common concern. Some of the most vibrant areas of global debate and action have been in the area of environment. In response to these new international conditions, non-governmental actors are linking and self-organizing on a global basis. Individuals, enterprises and organized civil society groups are today more directly influencing international relationships, and are being recognized as new actors in international law.[23] Non-Governmental Organizations (NGOs) have been at the forefront of increasing consciousness of global issues, researching the extent of transnational problems and crises, and mobilizing consensus and action. They have the ability to represent shared interests in ways that transcend the agendas of nation-states[24] and are now active participants in the norms and procedures of global economics as well as dispute resolution.

Nonpolitical organizations such as the International Arbitration Association and ICANN, the global body responsible for Internet domain name registration and dispute resolution are active globally. These organizations have been researching the extent of transnational problems and crises and mobilizing global consensus and action. They have the capacity to represent shared interests in ways that transcends the exclusive interests of nation states.[25]

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23 U.N. Resolution 96/31 reaffirms the consultative status of the Non-governmental organizations, (NGOs) which are considered nor public, nor private. The New Humanitarian International Order recognizes NGOs as subjects of the Public International order, even if they do not have legal personality.

24 Among such initiatives are the U.N Conference on Disarmament for Security and the 62nd Annual Public Information Gathering of NGOs, which took place in Mexico in September 2009. Nobel Peace Prize Winner Jody Williams, one of the speakers, pointed out opportunities to apply future savings from a reduction in military spending to benefit Humanity in areas such as education, health and natural disaster prevention. The objective of the gathering that was attended by more than one thousand NGOs was to enforce disarmament and the non-proliferationn agenda and expand transparency about the costs of weapons.

25 U.N. Resolution 96/31 reaffirms the consultative status of NGOs in accordance with the New Humanitarian International Order.

As a result of these trends, opportunities are growing for future generations to work together on CHM areas on a peaceful and mutually beneficial basis. Foundations for global governance are emerging in which individuals and public or private institutions create or use systems as a dynamic and complex process for reaching decision in global issues.[26] With these new actors to monitor the management of the "commons", Ostrom's theory may be instrumental in bringing access to outer space in conformity with the CHM concept.

IV. OSTROM'S THEORY FOR SUCCESSFUL MANAGEMENT OF THE COMMONS: A NEW PATH FOR ECONOMIC GOVERNANCE IN OUTER SPACE?

A far-reaching alternative approach to handling the commons has been developed by Elinor Ostrom, the recipient of the 2009 Nobel Prize in Economics.[27] Her book, "Governing the Commons: The Evolution of Institutions for Collective Action",[28] presents historically grounded ideas. Her approach to the management of "Common Pool Resources" (CPR) may be relevant to the development of outer space resources for the benefit of all humanity.

An influential 1968 article by economist Garret Hardin, "The Tragedy of the Commons", noted that reliance on national governments to use and dispose of the common property of humanity would produce unfortunate consequences. In his view, "they would manage natural resources to satisfy their electors, without being accountable to future generations". Hardin stated as well that, "freedom in a commons brings ruin to all".[29] Hardin's "tragedy of the commons" theory focused the attention of economists and policymakers on the "commons dilemma", in which people's short-term selfish interests

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26 PATRICIA BIRNE AND ALAN BOYLE, INTERNATIONAL LAW AND ENVIRONMENT 34 (2nd ed. 2007).

27 Scientific background on the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel compiled by the Economic Sciences Prize Committee of the Royal Swedish Academy of Sciences, 12 October 2009.

28 OSTROM ELINOR, GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION (1990). She was the recipient of the 2009 Nobel Prize in Economic Sciences of the Royal Swedish Academy of Sciences.

29 Garrett Hardin, *The Tragedy of the Commons* 162 SCIENCE 1243, 1244 (1968).

are at odds with long term group interests and the common good. In academia, the article prompted research into common pool resources such as the ozone layer, global fish populations, orbital resources and radio frequency.

Ostrom re-examined the problem of resource depletion in "Governing the Commons: The Evolution of Institutions for Collective Action". In her book, she objected to the presumption that common property governance necessarily leads to a "tragedy". She explored how real world communities manage communal resources such as fisheries and found that a number of factors produce successful resource management. Ostrom found that resource users themselves envisage rules and enforcement mechanisms that enable them to sustain tolerable outcomes. She pointed out that government imposed restrictions are often counterproductive, because central authorities lack knowledge about local conditions and have insufficient legitimacy. Moreover, the expectation of governmental imposed restrictions can discourage users from organizing themselves to manage resources. Ostrom noted a tendency in authors such as E.S. Rolph[29] to downplay the self-organizing capabilities of users and to assume their dependency upon an amorphous, fictitious and omni-competent entity called "the government". The users, says Ostrom, are viewed by such authors as turning to the government for a "program", rather than themselves struggling to find workable and equitable solutions to difficult problems within arenas demarcated by courts, by legislative bodies and by local authorities. She points out that,

> [T]he models that social scientists tend to use for analyzing CPR problems have the perverse effect of supporting increased centralization of political authority. First, the individuals using CPR's are viewed as if they are capable of short term maximization, but not long-term reflection about joint strategies to improve joint outcomes. Second, these individuals are viewed as if they are in a trap and cannot get out without some external authority imposing a solution. Third the institutions that individuals may have established are ignored or rejected as inefficient, without examining how these institutions may help them acquire information, reduce monitoring and enforcement costs, and equitable allocate appropriation rights and provision duties. Fourth, the solutions

30 E.S. Rolph, *Government Allocation of Property Rights: Who Gets What?* 3(1) J. POL'Y ANALYSIS & MGMT. 45, 61 (1983).

> presented for "the government" to impose are themselves based on models of idealized markets or idealized states.[31]

Ostrom's research found that the motivation to conserve common resources increased when people identified with a user group. In such relationships, individuals tended to abide by agreed restraints in using the common resource. Thus, conditions that foster a "user group" identity may promote long term management of these resources and increase social inter-dependencies. In fisheries, for example, each individual prefers to maximize their profits by fishing without limits. As a member of a user group, however, individuals recognize the need to avoid over fishing, so that there will be enough fish next year. In her findings, she stresses eight design principles associated with the success of user groups in sustainably managing CPRs and gaining compliance over generations to the rules in use.[32]

Could her principles be applied to future cooperative system for use of CPR in outer space introducing a new economic governance system? Ostrom has earned acclaim for showing that CPR can be managed by associations of users, in place of governments or private corporations. She has outlined a "design" process through which transparent, accountable systems of rules can emerge from communities that organize nonprofit systems to manage CPR areas. We have not seen yet communities based on her principles starting their own space initiatives. Would it be possible? Can economic governance as envisaged by Ostrom apply to outer space?

Ostrom's eight principles can apply to outer space activities as follows:

1. *Clearly defined boundaries*

Ostrom notes that boundaries of the CPR as well as the eligibility criteria for individuals to use the resources must be defined. Otherwise, the user group faces the risk that "any benefits they produce by their efforts will be reaped by others who have not contributed to these efforts".[33] Applied to outer space,[34]

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31 ELINOR, *supra* note 28, at 216.

32 ELINOR, *supra* note 28, at 90.

33 ELINOR, *supra* note 28, at 91.

34 A working definition accepted by many legal experts assumes that outer space generally begins at the lowest altitude above sea level at which objects can orbit the Earth, approximately 100 kilometers or 62 miles. STEPHEN GOROVE, THE GEOSTATIONARY ORBIT, ISSUES OF LAW AND POLICY (1979).

this principle of economic governance presents a challenge. If space is the province of all humanity, it would seem that any principle of CPR management that results in enclosing parts of the domain to "outsiders" is necessarily at odds with the basic precept of space as being open to use by all.

This barrier could be overcome only if the space frontier is seen as a "metacommons"[35] containing a potentially infinite number of defined CPR areas in space, in which Ostrom's principles can apply. If approached on this basis, all members of humanity can have equal standing in terms of their rights to form (non-overlapping) space CPR associations, and to set membership criteria for the use of the CPR as they deem appropriate. From these associations can arise "associations of associations", generating norms and contract based systems for dispute resolution.

2. *Sensitivity of rules governing the use of the CPR to local needs and conditions of the users.*

Successful CPR associations, Ostrom found, set rules regarding member inputs of labor, material and/or money based on their assessments of local conditions. Thus, members leave if they cannot respect the rules and the decisions on technology and financial resources required to undertake the project. This principle seems to be perfectly applicable to associations engaged in outer space activities.

3. *Collective-choice arrangements*

Ostrom found that effective CPR associations provided internal means for individuals affected by operational rules to participate in modifying such rules, in case where modifications are required. Applying this principle to space, it follows that successful development of communities benefiting from space resources, will require making provision, at the outset, for such arrangements. For instance, people affected by a launching facility should have means to work together on the environmental issues that might affect the area. In Brazil, for example, a launch center was being developed in a way

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[35] Metacommons was first defined as Commons-based peer production (or CBPP) in a phrase first used by Yale law professor Yochai Benkler to describe decentralized, Internet-based collaborative projects, http://planetmath.org.

that impinged upon communities with historical ties to the site. After a legal battle, the launch site – which cost hundreds of millions to build – had to be relocated to a different part of Brazil.[36] The costs and delays might have been minimized if a framework for community inputs had been in place prior to the final process of deciding the location for the original site.

4. *Monitoring*

Ostrom found that successful CPR groups also created neutral means of monitoring member compliance with the association rules. For space, user groups (launch organizations, satellite operators, etc.) could appoint external monitors to actively audit CPR operational conditions and member behavior and accountability. Such monitoring would help to bring transparency to activities taking place in outer space.

5. *Graduated sanctions*

Ostrom's research discovered that user group members who violate operational rules are likely to be assessed graduated sanctions, depending on the context and seriousness of the offense, by other appropriators, by the officials accountable to these appropriators, or by both. In the case of space, for example, an association of satellite operators and launch organizations might be established to work out graduate sanctions for debris in outer space and for holding parties responsible for damages.

6. *Conflict resolution mechanisms*

Ostrom further found that successful CPR user associations created systems for rapid low-cost resolution of conflicts among members, or between members and the officials in their associations. Regarding space, the Permanent Court of Arbitration established in December, 2009 a space law arbitration advisory group to develop arbitration and settlement rules for disputes related to outer space and map out their possible implementation.[37]

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[36] *Space Invaders: Brazilian Villagers Launch Protesters of Rocket Base*, THE WALL STREET JOURNAL, Oct. 9, 2008.

[37] *Gabrynowicz appointed to Space Law Arbitration Advisory Group for the Hague*, http://rescommunis.wordpress.com/2010/01/06.

Their recommendations were submitted to the Court's Administrative Council, which consists of one hundred and ten member states. Eventually the group's work will become part of the official body of optional arbitration rules used by the Permanent Court of Arbitration.

While there are currently no specific and detailed arbitration or settlement rules for space-related disputes, the need for them has become more pronounced with the accumulation of space debris. As space activities continue to expand, disputes will inevitably arise.[38] A key challenge will be to let user association develop their own conflict resolution systems, rather than impose top-down solutions.

7. *Minimal recognition of rights to organize*

Another finding of Ostrom's research is that the right of resource users to devise their own institutions should not be challenged by external governmental authorities. This is a very important design principle to extend to space, since the resource users otherwise would be faced with entanglements in non-transparent regulations and requirements to win licenses from Earth bound authorities. As Ostrom points out, "if external governmental officials presume that only they have the authority to set rules, then it will be very difficult for local CPR users to sustain a rule-governed CPR over the long run".[39]

8. *"Nested enterprises" that connect CPR groups to larger systems*

Ostrom found that the functions of appropriation, provision, monitoring, enforcement, conflict resolution and governance activities are best organized in multiple layers, as CPR groups multiply. Over time, networks of "nested enterprises" emerge, in which local associations delegate to trusted solution providers the responsibilities for agreed services.[40] Applying this principle to space, it is likely that networks of CPR area associations will grow as specializations and trust relationships emerge.

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38 *Ram Jakhu named to outer space group in The Hague*, Dec. 3, 2009, http://www.mcgill.ca/channels/announcements/item.

39 ELINOR, *supra* note 28, at 101.

40 ELINOR, *supra* note 28, at 214-15.

At present, it is clear that states are a primary force in outer space. Most of the programs are carried by governmental space agencies. Different legal instruments are used to implement governmental international cooperation in outer space**.** Treaties are used to define principles and set guidelines and bilateral and multilateral agreements are used between countries working in joint programs. The use of space technologies also requires the agreement of the interested governments liable for these activities, of the nationally-regulated industries that have developed the required technology.[41]

Although national space programs have been expanding, commercial approaches to space development have also been growing. Arianespace S.A., the company operating Europe's spaceport in French Guiana,[42] is a leading example of cooperation through a shareholding agreement. Arianespace is a for profit launch company, with twenty-four private and public sector shareholders[43] from ten European countries.[44] Since its creation in 1980, Arianespace has signed over two hundred and ninety launch contracts with sixty-five international operators, and has launched nearly two-thirds of the satellites in orbit today. Arianespace has generated sales of 919 million Euros in 2007, in its fifth successive profitable year.[45]

Purely private space initiatives are also flourishing.[46] Non-governmental space initiatives include Google's 03B Network Ltd. with Liberty Media,

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41 In emerging economies, governmental space programs are advancing. India's space agency has been focusing its efforts in space on practical applications, involving schools in remote areas, teaching students about space exploration and advanced technologies. It has announced plans to open its first astronaut training center in Bangalore. India's space agency is training young scientists, and is planning its first manned space mission in 2015. Brazil has entered into bilateral agreements with China and Ukraine to develop its national space program.

42 *See* http://www.arianespace.com.

43 Astrium, Aerospace. Alcatel Alennia Space, SABCA, Techspace aero SA, Christian Rovsing; Crisa, EADS CASA, Sner Grupo de Ingenieria SA, Astrium SAS, Clemessy SA, CNES, Comapnie Deutsch SAS, EADS France, L'Air Liquide, SAFRAN, Alcatel Space Italia, Avio Spa, Konsberg Defence, Dutch Space, SAAB Space, Volvo Aero Co., Oerlikon Space Ag, Rua Aerospace. Source: http://www.arianespace.com.

44 Belgium (3.15%), Denmark, France (60.12%), Germany (18.6%), Italy (9.3%), Netherlands (1.8%), Norway (0.1%), Spain (2.01%), Sweden (2.30%) and Switzerland (2.51%). Source: http://www.arianespace.com.

45 Maggie McKee, *Russian Rockets to Launch from the South American Base*, NEW SCIENTIST, (Apr. 12, 2005), http://www.newscientist.com/article/dn7257-russian-rockets-to-launch-from-south-american-base.html.

46 On legal aspects of corporations activities in outer space see Jose Monserrat, *Corporations and Space Law,* PROC. FORTY EIGHTH COLLOQUIUM ON L. OUTER SPACE 17 (2005).

which plans to launch 16 low earth orbiting satellites in late 2010 to bring affordable Internet access to less affluent regions of the world. Hughes, IPStar and other leading technology companies are also bringing space-based services directly to underserved people across the planet. Bigelow Aerospace has started developing next-generation crewed space complexes to revolutionize space commerce, with an expressed aim of opening the final frontier to all of humanity. In anticipation of this opening, several nonprofit associations have been formed to promote the space tourism industry, including the Space Tourism Society, and others.[47] Under current US law, however, any company proposing to launch paying passengers from American soil on a suborbital rocket must receive a license from the Federal Aviation Administration (FAA/AST).[48]

In keeping with moves by NGOs to take a more direct part in opening space, the Space Data Association Ltd. (SDA) was formed in 2009 as a nonprofit international organization with the announced aim of promoting safe satellite operations, including measures to minimize risks of collisions in space, and to improve satellite communications.[49] SDA was established in the Isle of Man initially by Inmarsat, Intelsat and SES, and it is open to all satellite operators and other participants. Its database will assemble information on satellite location, broadcast frequencies and power, signal polarization and coverage areas. Its intent is to reduce the time between when a customer notifies a satellite operator of interference and when that interference is located.

All these initiatives suggest an evolution beyond the premises of the Cold War era, when space exploration was treated as an arena for national rivalries. Today, people around the world are experiencing direct benefits from expanded information flows made possible through direct broadcast satellites and

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47 More information about the future of Space Tourism can be found at Space Tourism Lecture, which is a free online Space Tourism Lecture handout collection. Since 2003 Dr. Robert A. Goehlich and Pierluigi Polignano teaches the world's first and only Space Tourism class at Keio University, Yokohama, Japan. UniGalactic Space Travel Magazine is a bi-monthly educational publication covering space tourism and space exploration developments in companies like Space X, Orbital Sciences, Virgin Galactic and organizations like NASA.

48 The licensing process focuses on public safety and safety of property, and the details can be found in the Code of Federal Regulations, Title 14, Chapter III. This is in accordance with the Commercial Space Launch Amendments Act passed by Congress in 2004.

49 *See* http://www.space-data.org/sda/.

increasingly affordable two-way satellite Internet links. In a time of global transitions, opportunities are emerging for nonprofit, civil society organizations to take a leading role in the design of transnational rules capable of opening space on a basis that can benefit all.

As Ostrom notes in her research into CPR groups' success hinges on whether the user communities opt to supply their own institutions – or whether they instead look to external authorities to solve their problems. Once responsibility is ceded to states for solving CPR problems, users who do not have local institutions in place will tend to "wait for the government to handle their problems."[50]

So far, global civil society has been leaving to governments the decisions on development of the frontier *because governmental authorities indicate that they consider it their responsibility to solve space-related CPR problems.* However, the growing participation of individuals and NGOs in the international scene may create opportunities to bring Ostrom's design principles to realization. Such enlightened partnerships offer an opportunity for Ostrom's insights to influence the course of civilization in space, by helping humanity's frontier avoid a sterile future of national state rivalries or of capture by corporate monopolies.

50 ELINOR, *supra* note 28, at 213.

The Legal Loopholes in Space law: The Case of Shin Corporation of Thailand - Temasek Holding of Singapore Business Deal

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[The opinions and conclusions expressed herein are of the author. This article is not intended and should not be thought to represent official ideas, attitudes, or policies of Thailand.]

ABSTRACT

The commercial use of outer space, including the moon and other celestial bodies, particularly in the field of telecommunication has been accelerating in developing countries due to the potential of telecommunication in advancing development. This article aims to present the legal loopholes in space law by examining the commercial space activity, telecommunication service, through the view of Thailand under the framework of GATS. Using the acquisition of Shin Corporation of Thailand, by Temasek Holdings – the Singaporean Government's investment arm – as a case study, the article gives the overview about the Foreign Business Act B.E. 2542 (1999) of Thailand and the Thai regulations according to the GATS commitments on foreign equity cap in order to point out the legal effect and the legal gap resulting from such deal.

CONTENTS

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I. INTRODUCTION

The scandalous 2006 acquisition of Shin Corporation of Thailand, by Temasek Holdings – the Singaporean Government's investment arm – has caused many effects in Thailand. The deal which involved the transfer of 49.6% of shares of Shin Corporation for an approximate amount of Baht 73,300 million was so well-planned that it did not result in the payment of any tax, partially resulting in a bloodless coup and an investigation of the deal. To deal with international economic law and international space law, this article aims to examine and analyse the foreign investment and issues relating to commercial space activities and present the legal loopholes in space law from the viewpoint of Thailand by using the acquisition as a case study.

This article is divided into three main parts: basic telecommunication of Thailand under the framework of the General Agreements on Trade in Services (GATS), Thai laws on foreign investment and legal problems with space law. The first part will explain the general obligations and specific commitments of Thailand under GATS. The telecommunication sector will be the focus of this section as it is part of the business conducted by Shin Corporation. The second part will specifically concentrate on Thai laws by showing the relation

between Thai laws on foreign investment and the abovementioned deal which reflects the weakness and conflict in legislation. In the core of this article, the third part will examine the space law applicable to the case study so as to evaluate the legal aspect.

II. BASIC TELECOMMUNICATION OF THAILAND UNDER THE FRAMEWORK OF GATS

General Agreement on Trade in Services (GATS) is a partially successful product of the conventional sources in the Uruguay round of trade negotiation on 15 April 1994. By mixing the outcome of all negotiations with the fifteen-page Marrakesh Agreement Establishing the World Trade Organization as a "final act" and as a "single package", GATS is an "International Agreement" according to the definition of "treaty" in the Vienna Convention on the Law of Treaties, 1969.[3] Therefore, Thailand, as a member, is obligated to fulfill the final act under the commitments which Thailand submitted to the World Trade Organization (WTO), following the objects and the purposes of the GATS. At the time of the signature of the final act, Thailand had submitted and agreed the schedules of specific commitments in services and some lists of exemption.

The General Agreement on Trade in Services (GATS) consists of three key parts, that is, the framework agreement and its annexes, the schedules of specific commitments and the lists of Most-Favoured Nation Treatment (MFN) exemptions (Article II) submitted by member governments. The first part gives an overview of the telecom service sector of Thailand under GATS and analyzes some considerations on the obligations of the additional commitments, by reference paper, undertaken by Thailand to the WTO. Market access and national treatment as well as the mode of delivery services, access to and use of public telecommunications transport networks and services will be specially focused on so as to link to the next part where the

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[3] *See* Vienna Convention on the Law of Treaties, Jan. 27, 1980, 1155 U.N.T.S. 331, art 2:

(a) "treaty" means an international agreement concluded between States in written form and governed by international law, whether embodied in a single instrument or in two or more related instruments and whatever its particular designation.

domestic law, the Foreign Business Act of Thailand B.E. 2542 (1999), will be taken into consideration.

A. General Obligations of Thailand under GATS

GATS is divided into 6 parts.[4] The general obligations and disciplines, specific commitments and progressive liberalization of part II, III and IV respectively, are the most important features. The part II, general obligations and disciplines, covers several significant principles, but the 5 obligations below are the most important general obligations relating to the telecommunication service,[5] namely,

i. Most Favoured Nation Treatment (MFN)

The MFN treatment is a fundamental principle of GATS being applied across all sectors and all members, and underlying the MFN treatment is the principle of non-discrimination, both de jure and de facto,[6] amongst the members of WTO.[7] Applying this principle to the Thai telecom service, for example, it accordingly means that Thailand shall accord services and service suppliers of any member treatment no less favourable than that provided for like services and service suppliers of any other country in term of the right to access to and use of public telecommunication transport networks and services. Nevertheless, Thailand provided some horizontal commitments according to the Schedule and the list of MFN exemptions attached to the Fourth Protocol. Even the duration of such exemptions, in principle, must be valid for only ten years.[8]

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4 General Agreement on Trade in Services, Jan. 1, 1995, 1869 U.N.T.S. 183 [hereinafter "GATS"].

5 Bunaramrueang Biyabutr, Basic telecommunication Trade in Services in the Framework of WTO and the Implementation of Additional Commitments in Reference Paper: Case Study of Thailand 17 (2005) (unpublished Masters thesis, Faculty of Law, Thammasat University). Also, see World Trade Organisation, *Annex: The General Agreement on Trade in Services (GATS) and Its Relation to the Telecommunication Service Sectors*, http://www.wto.org.

6 European Communities – Banana III, Appellate Body Report, WT/DS27/AB/R ¶ 234 (Sept. 25, 1997).

7 *Supra* note 4, art. II.

8 See the horizontal commitments and specific commitments on Telecom Service of Thailand – World Trade Organisation, *Telecommunication Services*, http://www.wto.org/english/tratop_e/ser v_e/telecom_e/telecom_e.htm.

ii. Transparency

The principle of transparency, laid down in Article III of GATS, requires the Member to publish promptly "all relevant measures of general application" that affect operation of the Agreement as well as to notify the Council for Trade in Services of new or changed laws, regulations or administrative guidelines that significantly affect trade in sectors subject to Specific Commitments.[9] These transparency obligations are particularly relevant in the service areas where the role of regulation – as a trade protective instrument and/or as a domestic policy tool – tends to feature more prominently than in most other segments of the economy.[10]

In brief, by this principle, members have four significant responsibilities to accomplish transparency, namely, (i) publish all relevant laws and regulations, (ii) establish enquiry points in order to provide specific information and respond to requests by service suppliers of any member, (iii) notify the Council for any obligations affected to the Agreements and (iv) protect the confidential information.[11]

iii. Domestic Regulation

Under Article VI, paragraph 2, members are committed to operating domestic mechanisms ("judicial, arbitral or administrative tribunals or procedures") where individual service suppliers may seek legal redressal.[12] At the request of an affected supplier, these mechanisms should provide for the "prompt review of, and where justified, appropriate remedies for, administrative decisions affecting trade in service".[13]

Concisely, members have four main obligations according to the domestic regulation, that is, (i) appeals procedure, (ii) reasonable, objective and impartial

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9 *Supra* note 4, art. III.

10 World Trade Organisation, *The General Agreement on Trade in Services: An Introduction*, March 29, 2006, http://www.wto.org/english/tratop_e/serv_e/gsintr_e.doc.

11 *Supra* note 4.

12 *Supra* note 4.

13 *Supra* note 10.

administration of regulations, (iii) licensing, qualification and technical standards and (iv) taking account of international standards.[14]

iv. Monopolies and Exclusive Service Suppliers

Article VIII, paragraph 1 requires members to ensure that monopolies or exclusive service providers do not act in a manner inconsistent with the MFN obligation and commitments.[15] Article XXVIII (h) specifies, in turn, that a "monopoly supplier" is an entity that has been established by the member concerned, formally or in effect, as the sole supplier of a service.[16] This principle is very significant and strongly repeated in the framework reference paper of Negotiating Group on Basic Telecommunication (NGBT's Regulatory Framework Reference Paper).

v. Business Practices

Similar to Article VIII, Article IX refers to business practices that restrain competition and, thereby, restrict trade other than those falling under the monopoly-related provisions under Article VIII.[17] The Article requires each member to consult with any other member, upon request, with a view to eliminating such practices.

Moreover, there are two special business practices relating to telecom trade in services, namely, Government Procurement laid down under Article XIII, and Progressive Liberalization according to Part IV.

B. Commitments of Thailand under the Fourth Protocol[18]

As noted above, the obligations of any WTO member under GATS consist of the provisions of the Agreement and its Annexes as well as the specific commitments contained in the national schedule. The schedules are relatively complex documents in which each country identifies the service sectors to which it will apply the market access and national treatment obligations of

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14 World Trade Organization, *A Training Package Module: Services: GATS* 19 (1998).

15 *Supra* note 4, art. VIII, para 1.

16 *Supra* note 4, art. XXVIII (h).

17 *Supra* note 4, art. IX.

18 Fourth Protocol to the General Agreement on Trade in Services Concerning Basic Telecommunications, Apr. 30, 1997, 36 I.L.M. 354.

the GATS and any exceptions from those obligations it wishes to preserve.[19] The commitments and limitations are in every case entered with respect to each of the four modes of supply which constitute the definition of trade in services in Article I of the GATS: these are cross-border supply, consumption abroad, commercial presence and presence of natural persons. The definition could be briefly explained below.

Figure 1

Four Modes of Supplying Services under GATS[20]

Mode 1: Cross-border supply	The possibility for non-resident service suppliers to supply services cross-border into the member's territory (e.g. banking or architectural services transmitted via telecommunications or mail);
Mode 2: Consumption abroad	The freedom for the member's residents to purchase services in the territory of another member. On the other hand, it refers to situations where a service consumer (e.g. tourist or patient) moves into another member's territory to obtain a service;
Mode 3: Commercial presence	The opportunities for foreign service suppliers to establish, operate or expand a commercial presence in the member's territory, such as a branch, agency, or wholly-owned (e.g. domestic subsidiaries of foreign insurance companies or hotel chains);
Mode 4: Presence of natural persons	The possibilities offered for the entry and temporary stay in the member's territory of foreign individuals in order to supply a service. (e.g. accountants, doctors or teachers). The Annex on Movement of Natural Persons specifies, however, that members remain free to operate measures regarding citizenship, residence or access to the employment market on a permanent basis.

19 World Trade Organisation, *Guide to Reading the GATS Schedules of Specific Commitments and the List of Article II (MFN) Exemptions,* http://www.wto.org/english/tratop_e/serv_e/guide1_e.htm.

20 World Trade Organisation, *The General Agreement on Trade in Services (GATS): Objectives, Coverage and Disciplines*, http://www.wto.org/english/tratop_e/serv_e/gatsqa_e.htm.

After knowing the four fundamental modes of supply under GATS, the next important issue relates to the legal details of Thailand's commitments on trade in services, particularly the specific commitments and schedules of Thailand under mode 1 and mode 3. Some additional commitments will, then, be explained at the end of this section.

In compliance with GATS Article XX, Thailand's schedule provides a clear description of sectors and sub-sectors, limitations on market access, limitations on national treatment, and additional commitments in four respective columns.[21] The commitments in the Schedule are varied depending on each of the four modes of supply. Notably, mode 1 (cross border) and mode 3 (commercial presence) are most frequently used for the provision of telecom services[22] and comprehensively relates to the next part which takes an account on the domestic law. This paper will not indulge in the details of each commitment, but only exemplify the general commitments – in particular, those on market access and national treatment – in order to provide a background when we consider the ratio of foreign capital in Shin Corporation and Temasek Holdings after the deal.

i. Specific Commitment and Schedules

Admittedly, a specific commitment in a services Schedule is an undertaking to provide market access and national treatment for the service activity in question on the terms, limitations, qualifications and conditions of WTO members.[23] The value of making a commitment is that the members bind themselves by the specified level of market access and national treatment, undertaking not to impose any new measures that would restrict entry into the market or the operation of the service.[24] Commitments can only be withdrawn or modified after agreement of compensatory adjustments with affected countries.[25] The main classifications of commitments could be distinguished.

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21 *Supra* note 8.

22 *Supra* note 8.

23 *Supra* note 4, art. XX ¶ 1.

24 *Supra* note 4, Part IV.

25 *Supra* note 4, art XXI.

1. Market Access

The commitments on market access are the most important. They are specified by all members in their schedules for the protection of the internal market. The market access provisions of GATS – Article VI paragraph 2 – cover six types of restrictions that must not be maintained in the absence of limitations.[26] The restrictions relate to (a) the number of service suppliers, (b) the value of service transactions or assets, (c) the number of operations or quantity of output, (d) the number of natural persons supplying a service, (e) the type of legal entity or joint venture and (f) the participation of foreign capital.[27] These measures, except for (e) and (f), are not necessarily discriminatory, i.e., they may affect national as well as foreign services or service suppliers. All limitations in Schedules fall into one of these categories. They comprise four types of quantitative restrictions plus limitations on types of legal entity and on foreign equity participation.[28]

Applying these conditions of market access to telecommunication service, we can differentiate into two core types: the mode of delivery of service in telecom sector and the access and use of public telecommunications transport networks and services.[29] An example of the mode of delivery of telecom service is "GMPCS" (Global Mobile Personal Communication Service), a service in mode 1 of which most members provide for restrictions in network access, "Roaming" by GSM (Global Systems for Mobile Communications) which follows the movement of consumers in terms of Mode 2, etc.

2. National Treatment

The national treatment obligation under Article XVII of the GATS is to accord to services and service suppliers of any other member treatment no less favourable than is accorded to domestic services and service suppliers.[30] A member wishing to maintain any limitations on national treatment — that

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26 *Supra* note 10, at 6.

27 *Supra* note 4, art. XVI.

28 *Supra* note 8.

29 Annex on Telecommunications to GATS.

30 *Supra* note 4, art. XVII ¶ 1.

is any measures which result in less-favourable treatment of foreign services or service suppliers — must indicate these limitations in the third column of its schedule.[31]

In the context of Thailand Telecommunication service, Thailand specified no limitations on national treatment on the supply of public of telecommunication services as long as foreign equity participation does not exceed 40 percent.[32]

ii. Additional Commitments: Reference Paper

The Reference Paper refers to additional commitments, beyond the specific commitments on market access and national treatment, created after the Uruguay round of trade negotiation. Additional commitments are not obligatory but a member may decide in a given sector to make additional commitments relating to measures other than those subject to scheduling under Articles XVI and XVII. These can include, for examples qualifications, standards and licensing matters. The reference paper in telecommunication sector covers six matters: competitive safeguard, interconnection, universal service, licensing processes, independent regulators and allocation of scarce resources.[33] To easily understand these additional commitments on telecommunication service, we can generally classify these matters into four groups: dominance, market access, competition and conditions on telecommunication competition.

In brief, dominance is considered in terms of major suppliers in telecommunication sector, in compliance with the essential facilities for transport network, and whether there is an abuse of dominant position according to competition law. Market access focuses on the transparency of licensing process abiding by MFN and the allocation and use of radio frequency, numbers and right of way which are scarce resources.[34] In terms

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31 *Supra* note 19. See the example of the limitation of national treatment of Thailand.

32 World Trade Organisation, *Telecommunications Commitments and Exemptions*, http://www.wto.org/english/tratop_e/serv_e/telecom_e/telecom_commit_exempt_list_e.htm.

33 World Trade Organisation, *History of Telecommunication Negotiations*, http://www.wto.org.

34 World Trade Organisation, *Reference Paper on Basic Telecommunications – Allocation and Uses of Scare Resources*, http://www.wto.org/english/news_e/pres97_e/refpap-e.htm.

of competition, the detail suggests competitive safeguards by focusing on prevention of anti-competitive practices in telecommunications.[35] Interconnection and universal services are the conditions on telecommunication competition.

Thailand had initially provided specific additional commitments on telecommunication sector covering all six issues but preserved the right on essential facilities and major suppliers.[36]

III. THAI LAWS ON FOREIGN INVESTMENT

To stimulate economic growth in developing countries, foreign direct investment is an important factor. Moreover, a liberal economic policy supports the foreign investment. On the other hand, nationalism still influences developing countries, including Thailand, such that they wish to reserve their resources and business for their citizens. This controversy led to the enactment of law on foreign investment.

Thai laws on foreign investment, without exception, are passed to compromise the two schools of thought, liberalism and nationalism. The first law which defines 'foreigner' and restricts foreigners' business in Thailand can be traced back to the 1972 Announcement No. 281 of the National Executive Council B.E. 2515.[37] The definition of 'foreigner' was amended in 1992. Later due to inconsistency with the then economic conditions, investment and international trade,[38] it was repealed and replaced by the Foreign Business Act B.E. 2542 (1999). The next part will examine these laws with reference to their definition of 'foreign juristic person' and their loopholes before applying the laws to the business deal between Shin Corporation of Thailand and Temasek Holdings of Singapore and examining its consequences.

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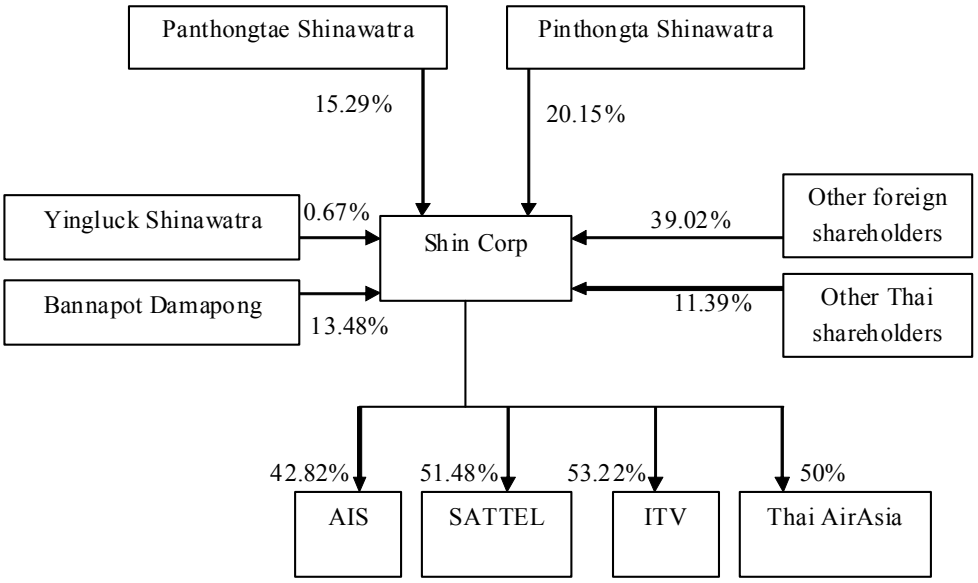
35 World Trade Organisation, *Reference Paper on Basic Telecommunications – Competitive Safeguards*, http://www.wto.org/english/news_e/pres97_e/refpap-e.htm.

36 World Trade Organisation, *Thailand-Condition Initial Offer*, TH/S/O/THA (Sept. 15, 2003). For details, *see* Biyabutr, *supra* note 5, at 93.

37 National Executive Council, Thailand, Announcement No. 281, B.E. 2515 (1972).

38 Remarks on Foreign Business Act, Thailand, B.E. 2542 (1999).

Figure 2
The shareholding structure as on January 20, 2006



A. Background of the Shin Corporation of Thailand – Temasek Holdings of Singapore business deal

In 1991, the Thai government granted a 30-year concession to Shin Corporation (Shin) – founded by Thaksin Shinawatra, former Prime Minister of Thailand and his family – to build, transfer and operate Thai satellites which are named as THAICOM series.

The concession is a Build-Transfer-Operate concession, of which name speaks for itself. Under this concession, Shin had to set up a new company to perform duties under the satellite operation agreement between Shin and MICT (Concession Agreement).[39] Shin Satellite Public Company Limited (SATTEL), which thereafter changed its name to Thaicom Public Company Limited, was founded in order to build satellites and then transfer them to the State. In reciprocation, the right to operate such telecommunication satellites remains with SATTEL.[40]

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39 Satellite Operation Agreement Between Shin and MICT [hereinafter "Concession Agreement"], § 4.

40 Concession Agreement, *supra* note 39, preamble ¶ 3, § 15.

Currently, there are four function satellites under Thailand's communication satellite fleet. THAICOM-1A was launched on December 1993 and on October 1994, THAICOM-2 was launched. THAICOM-3, launched in 1997, was replaced by THAICOM-5 on October 2006 due to power loss. THAICOM-4 or IPSTAR, launched on August 2005 is a new generation of broadband satellite that would serve the demand for high-speed broadband Internet access. They cover areas from Central Europe through Asia coasts.[40]

Figure 2 depicts the shareholding structure of Shin and SATTEL as on January 20, 2006, before the transaction. Shin Corp held shares in SATTEL to the tune of 51.48% which was in compliance with the shareholding ratio condition in the Concession Agreement.[41] The major shareholders of Shin securities, at that time, were the Shinawatras and their relatives.

Temasek is an Asian investment house owned by the government of Singapore. Its markets are mainly Singapore, Asia and other emerging economies. Amongst this, Thailand can be considered as one of its potential market. However, the name of Temasek became familiar to Thai people after the successful takeover of Shin Corp.

Temasek wished to purchase 49.59% of Shin's shares but the then 39.02% foreign shareholding ratio in Shin made such purchase impossible to succeed without turning Shin into a "foreign juristic person" under Thai domestic law. This would also terminate concessions in Shin's subsidiaries. Hence the transaction had to be completed through nominees, namely, Cedar Holdings and Aspen Holdings.

On January 23, 2006, during the term of Prime Minister Thaksin Shinawatra, Temasek – through its nominees – successfully acquired 49.59 % stake of Shin for an approximate amount of Baht 73,300 million, or Baht 49.25 per share. At that time, Baht 40.0171 equalled to USD 1.[42]

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41 FRANCIS LYALL & PAUL B. LARSEN, SPACE LAW: A TREATISE 378 (1st ed. 2009).

42 Concession Agreement, *supra* note 39, § 4.2. The original Concession Agreement mentioned that Shin has to hold at least 51% of the total shares in SATTEL. This clause was amended to decrease the ratio from 51% to 40% on October 27, 2004 during the Shinawatra administration.

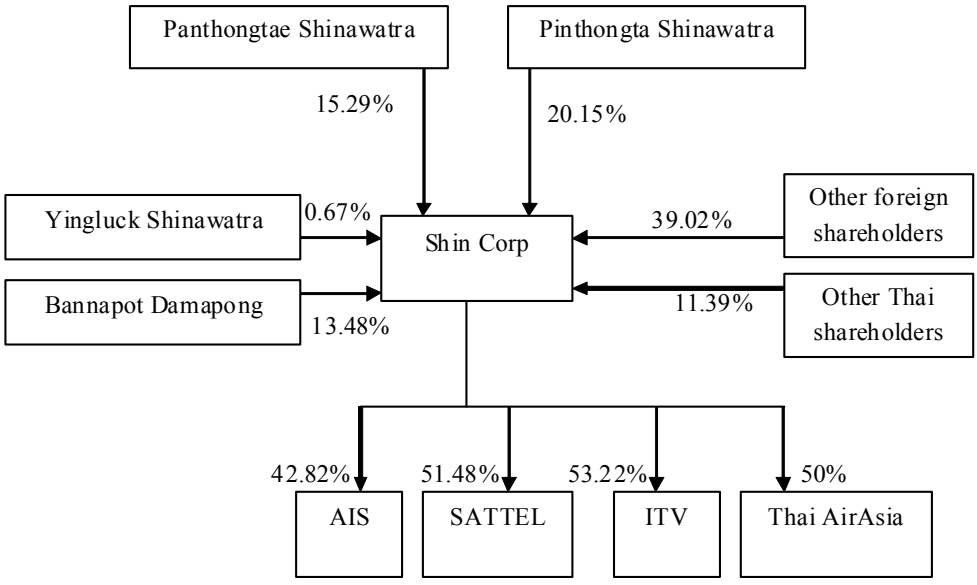
43 Bank of Thailand Foreign Exchange Rate, http://www2.bot.or.th/statistics/ReportPage.aspx?reportID=123&language=th.

Figure 3 indicates the structure of the deal and the shareholding structure after January 23, 2006. The 49.59% of shares were divided into 10.97% and 38.62% and purchased by Aspens Holdings and Cedar Holdings respectively.

This large portion of share acquisition reached the tender offer trigger point. However, with regard to SATTEL's stake, Cedar and Aspen were asked by the Securities and Exchange Commission not to make any tender offer for SATTEL's securities owing to the fact that Cedar and Aspen had no intention to acquire the SATTEL's securities and that it was considered immaterial to Shin's assets value.[44]

After the Shin-Temasek deal, SATTEL, one of the Shin's subsidiaries, operating four communication satellites under the awarded concession is indirectly controlled by Temasek, a Singaporean state-owned enterprise even though Shin changed its shareholding ratio in SATTEL from 51% to 41%.[45]

Figure 3
The shareholding structure as on January 20, 2006



44 *Shin Sell-Off: Ample Rich Ddeal Queried*, THE NATION, Jan. 27, 2006, http://www.nationmultimedia.com/2006/01/27/headlines/index.php?news=headlines_19764598.html.

45 *THAICOM Satellite Is Still Thai*, http://www.krusiam.com/community/forum2/view.asp?forumid=Cate00009&postid=ForumID0016676. As of August 5, 2010 Shin have held shares in SATTEL in an amount of 41.14% according to the Stock Exchange of Thailand, http://www.set.o r.th/set/companyholder.do?symbol=THCOM&language=en&country=US.

B. Thai Domestic Laws on Foreign Investment

To stimulate economic growth in developing countries, foreign direct investment is an important factor. On the other side, nationalism still has influence in developing countries, including Thailand, so they wish to reserve their resources and business for their nationals. This controversy leads to the enactment of general and specific legislations on foreign investment i.e. the Foreign Business Act B.E. 2542 (1999) (FBA), which governs the scope and types of permitted or prohibited business for foreigners in general, and the Telecommunications Business Act, B.E. 2544 (2001), which particularly focuses on telecommunication sector.

i. Foreign Business Act B.E. 2542 (1999) of Thailand

The Foreign Business Act B.E. 2542 (1999) (FBA) defines a foreigner in Section 4. The scope of this paper focuses only on "foreign juristic person", which is defined in Section 4 (2) – (4) as follows.

"Foreigner" means…

(2) Juristic person not registered in Thailand.

(3) Juristic person registered in Thailand having the following characteristics:

  (a) Having half or more of the juristic person's capital shares held by persons under (1) or (2) or a juristic person having the persons under (1) or (2) investing with a value of half or more of the total capital of the juristic person.

  (b) Limited partnership or registered ordinary partner-ship having the person under (1) as the managing partner or manager

(4) Juristic person registered in Thailand having half or more of its capital shares held by the person under (1), (2) or (3) or a juristic person having the persons under (1), (2) or (3) investing with the value of half or more of its total capital.[46]

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[46] *Supra* note 38, art. 4.

Subsection (2) is simply understood. Subsections (3)-(4) use the phrase 'capital share'. As a result, in order to be considered a foreign juristic person, more than half of such juristic person's share has to be held by a foreigner. It does not have to track the shareholding ratio of the shareholder again. This clause solved the problem on the interpretation of the repealed law on foreign investment, the Announcement No. 281 of the National Executive Council B.E. 2515 (1972).[47] In other words, it allows foreign firms to set up subsidiaries that are nominally owned by Thais but actually controlled by foreigners.[48]

In addition, the concept of foreign juristic person had been challenged on the basis of voting right structure. The share ratio of 51-49 can be twisted to form a nominee company by mentioning the 51% shares as a preferred share which has less voting right. The outcome is that the foreign shareholders can always control majority vote even though they have a lower share ratio. This practice has been approved by the Thai Ministry of Commerce since 1988.[49]

Since, in practice, foreigners are able to avoid the abovementioned prerequisites by structuring the Thai nominee corporation, to enhance its enforcement Sections 36 and 37 mention the civil and criminal punishment for Thai people and foreigners who violate, assist or support the violation such as a fine, an imprisonment and a stoppage of the business operation or the dissolution of the business or order a cessation of the shareholding or partnership as the case may be.

ii. Telecommunications Business Act, B.E. 2544 (2001) of Thailand

The Telecommunications Business Act, B.E. 2544 (2001) used to have a 75% rule. The telecommunication license shall not be granted to a foreigner

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47 The Council of State rendered legal opinion nos. Nor Ror 0601/866 dated August 2, 1991 and 332/2535 April 1992 that the criteria for juristic person to be considered as foreigner have to consider from the actual capital. In other words, it has to explore into the foreign investment ratio of each juristic person and then calculate altogether. *See* Legal opinion of the Council of State no. 332/2535 April 1992, http://app-thca.krisdika.go.th/Naturesig/CheckSig?whichLaw=cmd&year=2535&lawPath=c2_0332_2535.

48 Choon Yin Sam, *Economic Nationalism in Singapore and Thailand,* 16 SOUTH E. ASIA RES. 433, 454 (2008).

49 Kittipong Urapipattanapong, *Amending Foreign Business Act: Moving Forward or Backward* PRACHACHART BUSINESS NEWS 49 (Jan.18, 2007).

under the law on foreign business. In case of juristic person, the share holding proportion of Thai national should not be less than 75% of its total capital and not less than three fourth of the total number of directors as well as the authorized persons shall be of Thai nationality.[50] However, in 2006, 3 days before the Shin-Temasek deal, the 75% rule was abandoned and replaced with the criteria under the FBA.[51] Hence, Thai companies with 49% of foreign shareholders could apply for a telecommunication license which was in line with the Horizontal Commitments of Thailand to WTO.

C. Application to the Shin Corporation of Thailand – Temasek Holdings of Singapore Business Deal

This part will examine the Thai laws on foreign investment which are applicable to the Shin Corporation of Thailand – Temasek Holdings of Singapore business deal in order to examine the legal loopholes as a result of inefficient laws.

Before the transaction occurred, there had been 39.02% foreign shareholders in Shin and this did not exceed the 49% limitation. Temasek aimed to buy 49.59% of shares from the Shinawatra family and relatives. It was, thus, necessary to restructure the corporation. The 49.59% of shares were split into 10.97% and 38.62% and purchased by Aspens Holdings and Cedar Holdings respectively. Aspens Holdings is a Singapore registered company so it is a foreigner under Section 4(2) of the FBA and its acquisition of a share means acquisition by a foreigner. Adding this 10.97% with 39.02% existing foreign shareholders equals to 49.99% foreign shareholders so Shin reaches its maximum limit to be considered as a Thai entity. The point then is whether Cedar Holdings is a Thai juristic person.

As depicted in the 2nd tier of the structure, Cedar Holdings has three shareholders: Cypress Holdings, Siam Commercial Bank and Kularb Kaew. Cypress Holdings, holding 49% shares in Cedar Holdings, is undoubtedly foreigner. Siam Commercial Bank, a Thai bank, holds 9.9% shares. Kularb Kaew has to be a Thai juristic person so Cedar Holdings cannot be deemed as

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50 Telecommunications Business Act, Thailand, B.E. 2544 (2001), §8.

51 Act Amending the Telecommunications Business Act, Thailand, B.E. 2543 (2006).

foreigner and make the entire transaction valid and legal. The fact is that 51% of Kularb Kaew's shares are held by Thai investors and the rest are held by foreigners, so it is a Thai juristic person. Had the Announcement No. 281 of the National Executive Council B.E. 2515 (1972) still been in force, Cedar Holdings and accordingly Shin would have been foreigners under Thai law. Fortunately, the FBA, the enforceable law at the time of transaction, renounces the capital criteria and instead, binds itself with the share criteria. So Kularb Kaew, Cedar Holdings and Shin are *de jure* all Thai.

In short, looking only at the nationality requirement, the transaction is legitimate under the FBA and the Telecommunications Business Act, B.E. 2544 (2001). The concession awarded to AIS, another Shin's subsidiary operating telecommunication service business, and SATTEL cannot be revoked due to this ground.

IV. LEGAL PROBLEMS BECAUSE OF THE TAKEOVER OF THE SATELLITE COMPANY FROM A SPACE LAW PERSPECTIVE

'Taking back Thai satellites… is a patriotic duty for every Thai', the Thai *junta* head said about a year after the transaction was done.[52] This statement shows the importance of satellites and its effect of national pride, particularly in a developing country. In contrast, the other side views this investment as a purely business decision.[53] Regardless of the intention of entry into this transaction, it was accomplished. Yet, what should be considered are its consequences, especially legal consequences. This part will focus only on international space law, beginning with the overview of satellite operation of Thailand and then evaluating the legal aspects. Due to the fact that the Department of Special Investigation has been investigating the case and whether Shin and Temasek breached the FBA or not, this article will analyze the outcome of two scenarios. First, the deal is legal and therefore, Shin is a Thai juristic person and second, that the deal is illegal and Shin is not a Thai juristic person.

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[52] *Duty of every Thai to see satellites returned*, THE NATION (Feb. 19, 2007), http://nationmultimedia.com/2007/02/19/headlines/headlines_30027229.php.

[53] *Thailand May Offer to Buy Shin Assets From Temasek*, BLOOMBERG (Feb. 19, 2007), http://www.bloomberg.com/apps/news?pid=20601080&sid=aXVXTFmjAKNs&refer=asia.

With regard to space law, Singapore and Thailand have become member states of the International Telecommunication Union (ITU) since 1965 and 1883 respectively.[54] As of 2010, Thailand has ratified two out of five outer space treaties, the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (the Outer Space Treaty) and the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (the Rescue Agreement) while Singapore has also ratified these two treaties plus the Convention on International Liability for Damage Caused by Space Objects (the Liability Convention) as well as signed the Convention on Registration of Objects Launched into Outer Space (the Registration Convention).[55]

A. Geostationary Orbital Slots

Outer space is not subject to national appropriation, mentioned in Article III of the Outer Space Treaty.[56] Geostationary orbit, as part of outer space, has a special value owing to its constant position with respect to the Earth. The non-appropriation had been claimed to exclude geostationary orbit by the equatorial developing countries.[57] However, this claim is considered effectless[58] and the non-appropriation in outer space, including geostationary orbit, is considered customary law as well as treaty law.[59]

Applying this legal concept to this case, irrespective of Shin's and SATTEL's nationality, Thailand does not have an ownership in orbital slots.

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54 International Telecommunication Union, *Membership List*, http://www.itu.int/cgi-bin/htsh/mm/scripts/mm.list?_search=ITUstates&_languageid=1.

55 United Nations Treaties and Principles on Outer Space and Related General Assembly Resolutions Addendum – Status of International Agreements Relating to Activities in Outer Space, ST/SPACE/11/Rev.2/Add.3 (Jan. 1, 2010), http://www.oosa.unvienna.org/pdf/publication s/ST_SPACE_11_Rev2_Add3E.pdf.

56 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, Jan. 27, 1967, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty], art. III.

57 Declaration of the First Meeting of Equatorial Countries (known as the Bogotá Declaration) (Dec. 3, 1976), reprinted in 6 J. SPACE L. 193 (1978).

58 *Supra* note 41, at 62.

59 *Supra* note 41, at 59.

Moreover, the Concession Agreement between MICT and Shin obviously mentions that the right bestowed by the MICT to Shin is the right to operate communication satellites and collect service fees for satellite transponder leasing. Nothing in the Concession Agreement relates to the transfer of orbital slots to Shin or the ownership of slots by the government.

In sum, under the concession condition, a right in the orbital slots belong to the MICT, that is, the state and not the private entity.[60] SATTEL is entitled to use them only to the extent provided under the term in the Concession Agreement.

B. Ownership of Satellite

The Build-Transfer-Operate concession had been elaborated in the Concession Agreement. It stated that the ownership of all satellites shall be the MICT's, after such satellites are launched into their orbital location.[61] This means, thus, that SATTEL does not own any satellite in the THAICOM fleet. It only has the right to operate communication satellites and collect service fees for satellite transponder leasing in return. Briefly, even though the shareholder structure in SATTEL's parent company changed, all of the satellites are still the assets of the state of Thailand.

C. Responsibility and Liability

Before beginning the discussion in detail, it is interesting to note that the Outer Space Treaty in its English text uses the terms 'responsibility' in Article VI and 'liability' in Article VII while the Treaty in other languages, which are equally authentic,[62] does not distinguish between the two. They use the equivalent term of 'responsibility' in both Articles. This inconsistency was questioned by Professor Stephen Gorove followed by the issue of whether international responsibility would entail liability in all situations.[61]

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60 Concession Agreement, *supra* note 39, § 11.

61 Concession Agreement, *supra* note 39, preamble ¶ 3, § 15.

62 Outer Space Treaty, *supra* note 56, art. XVII. In french, the same term *responsabilité* qualified as *responsabilité legale* is used, thus not differentiate in terminology. *See* Bin Cheng, *International Responsibility and Liability for Launch Activities*, *in* THE USE OF AIR AND OUTER SPACE: COOPERATION AND COMPETTION 159, 166 (Chia-Jui Cheng ed., 1998).

63 STEPHEN GOROVE, DEVELOPMENTS IN SPACE LAW: ISSUES AND POLICIES 227 (1st ed, 1991).

Nevertheless, in his article, Professor Bin Cheng examined the different regimes and the scope and meaning of international responsibility and liability with respect to launching activities.[64]

Responsibility in Article VI of the Outer Space Treaty and liability in Article VII are intertwined. Both responsibility and liability are placed in state entities and not any nongovernmental entity because of the intention to ensure that any outer space activity should be carried on in compliance with the international law.[65] Unlike the time when the Outer Space Treaty was drafted, nowadays, private entities increasingly participate in outer space activities. Their states bear international responsibility for activities carried by such private entities by licensing and continuing supervision.[66] Licensing is, hence, an *a priori* administrative step and continuing supervision is a later one.

The possibility that Shin is not a Thai juristic person indicates the weakness of continuing supervision of the State. International space law emphasizes the right or duty of a State to supervise private entities. Domestic law is the mechanism to make this system effective. Unfortunately, specific law on space law does not exist in Thailand and the Concession Agreement cannot be terminated unless the deal is violated by the FBA. In this case study, at least from the Thai side, until the share acquisition agreement had been signed, the public was unaware of the transaction. This questions the proper extent of the 'continuing supervision' concept.

Turning to liability, international space law binds liability with the concept of launching state and categorises 'launching states' into four categories i.e. State launching a space object, State procuring the launching of a space object, State from whose territory a space object is launched and State whose facility a space object is launched.[67] It is undeniable that Thailand is a launching state for every THAICOM satellite.

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64 BIN CHENG, GENERAL PRINCIPLES OF LAW AS APPLIED BY INTERNATIONAL COURTS AND TRIBUNALS 201, 222, 223 (1st ed, 1953).

65 MANFRED LACHS, THE LAW OF OUTER SPACE: AN EXPERIENCE IN CONTEMPORARY LAW-MAKING 122 (1st ed, 1972).

66 Outer Space Treaty, *supra* note 56, art. VI.

67 Outer Space Treaty, *supra* note 56, art. VII; Convention on International Liability for Damage Caused by Space Objects, March 29, 1972, 961 U.N.T.S. 187, art. I (c),.

After the transfer of share in the Shin-Temasek deal, it is doubted whether the acquisition country perceives to be regarded as a launching state.[68] In contrast to Thailand, Singapore has not been involved in any launching, procuring the launching of any THAICOM satellites or offered its territory or facility for the launch of THAICOM satellites; therefore, Singapore is not a launching state under the current definition.

The concept of nongovernmental user's liability under international space law is that the government is directly liable.[69] Consequently, if there is any damage caused by THAICOM, Thailand, as a launching state, not Singapore, will be liable for compensation for the act of SATTEL of which a great number of shares ultimately are held by a foreign juristic person.

Steven Gorove also pointed out that in case the liability is not waived, the nongovernmental user would have to reimburse the government in the end.[70] Looking into the Concession Agreement, it clears the way by placing the entire responsibility of compensation on Shin in case of damage caused by satellites.[71] This clause also shows that SATTEL, under the control of Shin, a party in the Concession Agreement, is the actual controller of satellites. Hence if the Thai government pays any compensation for damage caused by THAICOM satellites, the governmenst can seek recourse from Shin under domestic law and procedure based on the Concession Agreement. Shin's repayment links to Temasek and eventually Temasek's investors. It is worth noting that even though this scenario places liability in the actual controller, the State has to recompense in advance.

Academically speaking, this deal raises concern on the change in status of ownership or control of a space object in case of non-governmental entity while international space law links liability with State or, to be more precise, launching state. In addition, where the State of nationality of the new operator is not the launching state, the transfer of liability between States is suspect.

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68 Committee on the Peaceful Uses of Outer Space, Legal Subcommittee, 748th Meeting, Unedited Transcript, COPUOS/LEGAL/T.748 6-7 (Mar. 26, 2007).

69 *Supra* note 63, at 228.

70 *Supra* note 63, at 228.

71 Concession Agreement, *supra* note 39, § 46.

D. Registration of Space Object and Jurisdiction and Control

Article VIII of the Outer Space Treaty elaborates on jurisdiction and control over space object of a state of registry. The term 'State of registry' was explained as a launching State on whose registry a space object is carried in accordance with article II.[72] Jurisdiction and control are connected with State, not with private entities.[73] Despite the fact that the owner of satellites is the Thai government, SATTEL is entitled to operate and control the satellites including its ground station. When Shin is under the control of Temasek, accordingly, it is doubted whether SATTEL is indirectly controlled by Temasek or not. If so, the jurisdiction and control of space object may be affected.

The importance of registration is not only for identification of space object but also for establishing responsibility, for ownership, for the exercise of control and for liability.[74] In practice, neither Singapore nor Thailand ratified the Registration Convention. Singapore signed but did not ratify the Convention. Since Thailand did not ratify the Convention, it is less possible that Thailand will furnish or register THAICOM satellites to the United Nations. According to the United Nations Office for Outer Space Affairs (UNOOSA)'s website, Thailand is mentioned in the section of the State of registry for all of the five THAICOM satellites although the information is in square brackets and highlighted in green which indicates that the information has not been officially submitted by Thailand.[75]

In case of transfer of in-orbit satellite, the registration must be changed as well. However, the Registration Convention narrows the eligibility of persons to register space object to the launching states.[76] There are a few

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72 Convention on the Registration of Objects Launched into Outer Space, Nov. 12, 1974, 1023 U.N.T.S. 15, art. 1 (c).

73 Bernhard Schmidt-Tedd & Michael Gerhard, *Registration of Space Objects: Which are the advantages for states resulting from registration?*, *in* SPACE LAW: CURRENT PROBLEMS AND PERSPECTIVES FOR FUTURE REGULATION 121, 125 (Marietta Benkö & Kai-Uwe Schrogl eds., 2005).

74 *Supra* note 41, at 84.

75 United Nations Office for Outer Space Affairs, Search Results, http://www.oosa.unvienna.org/oosa/search.do;jsessionid=6453F99374D1F29A78B46981C4D4B684.WEB02.

76 *Supra* note 72, arts. 1 and 2.

cases about transfer of in-orbit satellite which considered registration. For instance, four telecommunication satellites, registered by the United Kingdom, were transferred from the United Kingdom to China in 1997. This case does not generate any problem since China is also a launching state. The United Kingdom declared to the UNOOSA that it ceased to be the State of registry.[77] Correspondingly, the UNOOSA's website shows the state of registry of these four satellites as China (formerly UK).[78] Another one is the BSB-1A transfer from the United Kingdom to Sweden. The information submitted to the UNOOSA shows that states of registry are the United Kingdom and Sweden despite the fact that Sweden is not a launching state.[79] The other case is the transfer from INTELSAT to the Netherlands which is not the launching state. In this case, the Netherlands obviously show its status as not being the 'launching State', 'State of registry' or 'launching authority' but the Netherlands, according to Article VIII of the Outer Space Treaty, bears international responsibility and has jurisdiction and control after the transfer.[80] Accordingly, the UNOOSA made a remark about this fact and did not put the Netherlands in the state of registry.[81] Nevertheless, there has never been any claim about the liable State after the transfer.

These practices are not exactly the same as the Shin-Temasek case in which the satellites were not transferred but the control was. Provided that Shin is of Thai nationality, the green word of 'Thailand' in square brackets as a state of registry in the UNOOSA's website is uncontested. In the event that

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77 United Nations Office for Outer Space Affairs, Information Furnished in Conformity with the Convention on Registration of Objects Launched into Outer Space, ST/SG/SER.E/333, (April 3, 1998), http://www.oosa.unvienna.org/oosa/download.do?file_uid=416.

78 United Nations Office for Outer Space Affairs, Search Results, http://www.oosa.unvienna.org/oosa/search.do?cur=1&objectStatusCrit=&duplicateRegistrationCrit=&spacecraftCrit=&gsoActiveCrit=&nameOfSpaceObjectCrit=&unRegisteredCrit=&docNoIdxCrit=&sarConstellationCrit=&nrbitCrit=&docSeriesIdxCrit=&npsYesNoCrit=&stateOrganizationCrit=CN&dateOfLaunchCrit=&launcherCrit=&submit_btn=SEARCH&spacestationCrit=&internationalDesignatorCrit=&gsoYesNoCrit=&gpsConstellationCrit=&launchFacilityCrit=.

79 United Nations Office for Outer Space Affairs, Information Furnished in Conformity with the Convention on Registration of Objects Launched into Outer Space, ST/SG/SER.E/377, http://www.oosa.unvienna.org/oosa/download.do?file_uid=1493; Yoon Lee, *Registration of space objects: ESA member states' practice*, SPACE POL'Y 44, 47 (2006).

80 Yoon Lee, *id.*, at 48.

81 United Nations Office for Outer Space Affairs, U.N. G.A. Doc. A/AC.105/806 (Aug. 22, 2003); United Nations Office for Outer Space Affairs, U.N. G.A. Doc. A/AC.105/824 (March 16, 2004).

Shin is considered as a foreigner, the government has to check the legality and may lead to the termination of the Concession Agreement or may negotiate for other possible solutions. Nevertheless, in whatsoever case, Singapore, as mentioned earlier, is not the launching state under the international space law definition so it cannot be a state of registry.

However, a few academic questions arise. Can Thailand suspend or stop being considered as a state of registry during the said period? What are the outcomes of that notification? Will it cut the notifying State any connection to the notified space objects? Moreover, since the State which acquired the control of space objects is not the launching state, it cannot literally be eligible to be a state of registry.

V. CONCLUSION

The obligations and commitments of Thailand under the framework of GATS particularly in the basic telecommunications service sector have shown great commitment to foreign equity cap. These obligations and commitments were adapted and transformed into the national law, Foreign Business Act B.E. 2542 (1999) and Telecommunications Business Act B.E. 2544 (2001). However, regarding the gap and weakness of Thailand's domestic law resulting from the deal explained above, it has raised some considerations on nominee company and led to the proposal on revision of definition of 'foreigner' of the FBA. Without harming the principle of progressive liberalization propounded by the WTO, Thailand had an incentive to tackle this issue by revising the definition of "foreigner" of the FBA B.E. 2542 (1999). It is expected that the revision will bridge the legal gap relating the definition of 'foreign juristic person' under the FBA.

Regarding the criterion of share limitation to be considered as 'foreigner' for juristic person, the current FBA weighs on the ratio of shares held by foreigners which leads to the avoidance by setting up a nominee as exemplified by the case of the acquisition on Shin Corporation of Thailand; hence, the newly drafted definition of 'foreigner' is proposed by relying on the stricter criterion of the voting right besides the ratio of share holders and the registration in Thailand. In other words, if foreigners hold less than 49% of shares in a company and have more than half of voting rights, the company is

considered as "foreigner". Notably, the incentive to revise this law is in order to protect the reserved national business from the movement of nominee corporation. Despite the new draft being able to partially fill a loophole, there is still a leak because a foreigner can control the company by having a power to nominate directors regardless of voting rights. In particular, the operation of telecommunication service is highly related to national security. It should not permit foreign dominance through direct and indirect control or influence in setting a policy and engaging in management beyond that allowed by their share ownership. To prevent foreign dominance of local telecommunication business, this idea is similar to the recently drafted regulation proposed by the National Telecommunications Commission regarding the auction of 3G-2.1GHz spectrum licences.

Importantly, such acquisition has indicated great concerns in tackling threats in the international space law especially the state responsibility and liability from the space activity. From the space law point of view, the definition of 'launching state', which allows for four possible categories of States to be liable for damage caused by the launched space object; 1) the State which launches the space object, 2) the States which procures the launching, 3) the State where the launch takes place and 4) the State which owns the facility used in the launching,[82] fails to cover the case of nominee as previously explained.

Given the gradual development of space activities by developing countries in subsequent years, the ambiguous circumstance of the responsibility and liability regime particularly in the case of space activities operated by the nominee of foreigner juristic person should be taken into serious consideration. The interesting question is whether it is an essential point to amend and broaden the definition and scope of "launching state" as well.

It is apparent that the United Nations adopted the Resolution 59/115 on Application of the concept of the "launching State"[83] to encourage States to

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82 C.E.S. Horsford, *Legal Liability in Outer Space – the New Treaty*, 4(2) INT'L REL. 137, 138 (1972) cited by BRUCE A. HURWIZ in STATE LIABILITY FOR OUTER SPACE ACTIVITIES IN ACCORDANCE WITH THE 1972 CONVENTION ON INTERNATIONAL LIABILITY FOR DAMAGE CAUSED BY SPACE OBJECTS 22 (1992).

83 G.A. Res. 59/115, U.N. Doc. A/RES/59/115 (Dec. 10, 2004).

comply with international obligations on international space laws. Therefore, in relation to this case study only, States should implement national laws on the authorization and supervision of the activities in outer space of non-governmental entities under their jurisdiction. Further, it calls on States to voluntarily reveal information on the current practices regarding on-orbit transfer of ownership of space objects.

Although the preamble of this resolution bears in mind the term "launching state" as used in the Liability Convention and the Registration Convention is significant in international space law, it fails to clearly specify whether it covers the nominee case. As a result, as long as the problem of the acquisition of share by foreigner, specifically in commercial space business, has not been seriously solved, Thailand as a member of United Nations should go on strengthening its laws and regulations on supervision. Considering the disadvantage of the developing countries in terms of technological space innovation and a great need of capital in space investments and activities, it needs to be considered whether it is worthy to broaden the view of responsibility and liability regime to cover the State of nationality of the juristic person which has the actual control in the satellite business so that, at least, this liability regime can narrow the gap as well as balance the advantage and disadvantage between nations.

Table 1
Definition of Foreigner

General Agreement on Trade in Services (Article XXVIII (m) (n))	Announcement No. 281 of the National Executive Council (Section 3)	Announcement No. 281 of the National Executive Council (Amended in B.E. 2535 (1992) (Amended Section 3 (1))	Foreign Business Act B.E. 2542 (1999) (This Act repeals the Announcement No. 381 of the National Executive Council.) Section 4	Draft Foreign Business Act
(m) "juridical person of another Member" means a juridical person which is either: (i) constituted or otherwise organized under the law of that other Member, and is engaged in substantive business operations in the territory of that Member or any other Member; or (ii) in the case of the supply of a service through commercial presence, owned or controlled by: 1. natural persons of that Member; or 2. juridical persons of that other Member identified under subparagraph (i);	Foreigner means natural person and juristic person not of Thai nationality and including (1) Juristic person of which half or more capital are belong to foreigner (2) Juristic person having half or more of the juristic person's capital shares held by foreigner or having half or more foreigners as a shareholders regardless how much such foreigners invest (3) Limited partnership or registered ordinary partnership having the managing partner or manager as foreigner	(1) Juristic person of which half or more registered capital are belong to foreigner or juristic person having foreigner or juristic person investing in shares with a value of half or more of the total capital of the juristic person.	"Foreigner" means (1) Natural person not of Thai nationality. (2) Juristic person not registered in Thailand. (3) Juristic person registered in Thailand having the following characteristics: (a) Having half or more of the juristic person's capital shares held by persons under (1) or (2) or a juristic person having the persons under (1) or (2) investing with a value of half or more of the total capital of the juristic person. (b) Limited partnership or registered ordinary partner-ship having the person under (1) as the	"Foreigner" means (1) Natural person not of Thai nationality. (2) Juristic person not registered in Thailand. (3) Juristic person registered in Thailand having the following characteristics: (a) Having half or more of the juristic person's capital shares held by persons under (1) or (2) or a juristic person having the persons under (1) or (2) investing with a value of half or more of the total capital of the juristic person or juristic person having persons under (1) or (2) having authority under the law or article of association or agreement

(n) a juridical person is: (i) "owned" by persons of a Member if more than 50 per cent of the equity interest in it is beneficially owned by persons of that Member; (ii) "controlled" by persons of a Member if such persons have the power to name a majority of its directors or otherwise to legally direct its actions; (iii) "affiliated" with another person when it controls, or is controlled by, that other person; or when it and the other person are both controlled by the same person;			managing partner or manager (4) Juristic person registered in Thailand having half or more of its capital shares held by the person under (1), (2) or (3) or a juristic person having the persons under (1), (2) or (3) investing with the value of half or more of its total capital.	on voting right to have half or more of voting right of the total voting right of the juristic person. (b) Limited partnership or registered ordinary partner-ship having the person under (1) as the managing partner or manager (4) Juristic person registered in Thailand having half or more of its capital shares held by the person under (1), (2) or (3) or a juristic person having the persons under (1), (2) or (3) investing with the value of half or more of its total capital or juristic person having persons under (1) or (2) having authority under the law or article of association or agreement on voting right to have half or more of voting right of the total voting right of the juristic person.

A New Liability Regime for the Space Sector – an Economic Imperative

Lotta Viikari[1]

Abstract

It is not always easy to establish liability pursuant to international law of outer space, yet damages in the space sector can be considerable. The damaging potential of space activities can exceed the capacity of any single space faring entity to make reparation. Absolute and unlimited liability could render the highly hazardous activities uninsurable. Complex causation questions may complicate the situation further. The mere determination of the liable entity can be a problem. Accordingly, allocation of losses within a larger community of relevant entities to balance the competing concerns would seem useful. It could better retain the economic viability of the space sector, yet still secure adequate indemnification for damages. Compensation claims for damage resulting from particularly risky activities should be facilitated, but operators of activities that are deemed necessary yet entail high risks should be shielded from excessive claims. The setting in the space sector seems in many respects similar to that in the use of nuclear power, which also entails significant risks. In this sector, the solutions adopted include, inter alia, a three-tiered system of compensation with absolute but limited liability of the operator of a nuclear installation, coupled with limited liability of the state in which the installation is located, and an international compensation fund. There are also certain other examples of international trust fund mechanisms serving very similar purposes which the space sector could draw inspiration from.

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[1] This article is based largely on the author's presentation given in the 60th International Astronautical Congress, 12-16 October 2009, Daejeon, South Korea. Lotta Viikari is Professor of Public International Law and Director of the Institute of Air and Space Law at the University of Lapland, Rovaniemi, Finland. Previously, she has served as an Acting Professor of Private International Law at the University of Lapland and as an Assistant Professor in Constitutional Law and International Law at the University of Joensuu, Finland. Additionally, she has had various researcher positions at the University of Lapland. Professor Viikari holds a degree of Doctor of Laws (University of Lapland), a degree of Licentiate of Administrative Sciences (University of Joensuu), and a Master of Laws degree (University of Lapland). She has published especially in the areas of space law, international environmental law, and law of the sea. Her publications include three monographs of which The Environmental Element In Space Law: Assessing The Present And Charting The Future Studies In Space Law, Vol 3 (2008) has been awarded the Social Science Book Award of the International Academy of Astronautics (2009) and the Finnish Lawyers ´ Society Award for the best legal PhD dissertation in Finland (2007).

CONTENTS

I. INTRODUCTION

Liability for damages in the space sector is problematic in various ways. Firstly, it can already be a challenge to determine the most appropriate (or even any) liable entity or entities. This is partly due to deficiencies in the legal instruments of the international law of outer space. The five U.N. space treaties date back to the 1960s and 1970s; at that time, it was not easy to imagine the needs of the modern space sector in this respect. It can also be difficult to determine the source of damages which take place in outer space, possibly tens of thousands of kilometres from the Earth. In addition, complex causation questions cannot be avoided. Consider, for instance, the problems in attributing damage to particular pieces of space objects and, moreover, the potential cumulative effects of damaging events. Additional problems may derive from the fact that, pursuant to the 1972 Convention on International Liability for Damage Caused by Space Objects (hereinafter Liability Convention),[2] there may be various 'launching states' equally liable for compensation.[3]

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[2] Convention on International Liability for Damage Caused by Space Objects, Nov. 29, 1971, 961 U.N.T.S. 187.

[3] The term "launching state" includes "(i) A State which launches or procures the launching of a space object; (ii) A State from whose territory or facility a space object is launched". *See* Convention on International Liability for Damage Caused by Space Objects, art. I.c.

The problems related to liability in the space sector are manifold and involve various aspects of law and policy. Some of them have been know for decades, some are of more recent origin. What is common to many of them is that they revolve around questions of significant economic importance. This article focuses on these issues.

In the following pages, the article will first explain, in brief, why an improved liability system increasingly is an economic imperative for the space sector. After that, the current international liability regime pertaining to space activities and its shortcomings are examined. The article will then move to the area of nuclear liability, which could serve as a model for an improved liability regime for the space sector. In addition, some other liability regimes are also examined for the same purpose. Finally, a proposal for a new space liability regime is presented, as well as certain particularly important lessons that the space sector ought to learn from the analogous areas of human activity.

II. WHY DO WE NEED A BETTER LIABILITY SYSTEM FOR SPACE ACTIVITIES?

From an economic point of view, the current international regulation of liability in space activities entails various problems. One of these is the above mentioned fact that, pursuant to the Liability Convention, a single damaging incident may involve several 'launching states' who are equally liable for compensation. This can result in overlapping insurance coverage. Obviously, at least from the point of view of the victim, "too much" insurance is normally better than no insurance at all. However, from the point of view of insurance markets, such a situation is far from desirable. In addition, the extensive definition of a launching state used by the convention can result in rather unfair outcomes in terms of liability. At the same time, however, the definition remains vague enough to complicate in many cases the determination of which states in fact can be seen as constituting liable launching states.

Moreover, the damaging potential of space activities exceeds the capacity of any single space faring entity to make reparation. In particular, if nuclear power sources are used, damage can be considerable. For instance, if

radioactive materials from defunct satellites enter the atmosphere and fall down to densely inhabited areas of the Earth, the consequences can be drastic.[4] Even in the case of less serious incidents, absolute and unlimited liability (as currently established by the Liability Convention for damages taking place on Earth) would directly raise the costs of space activities and thus limit the development of space industry. It could also render what are inherently highly hazardous activities uninsurable.[5] Additionally, the victims´ well-secured position may occasionally be excessively strong from the perspective of space faring entities.

Where damages occurring in outer space are concerned, the Liability Convention offers a fault liability system. This system entails numerous problems of legal and economic nature which necessitate a more feasible liability regime sooner or later. The current system can result in very high damages also where incidents in outer space are in question. The apportioning of liabilities among different states involved can be complicated and may even lead to unfair or quite haphazard outcomes.

Furthermore, the criteria offered by the Liability Convention for determining compensation are rather ambiguous; so is even the definition of damage that needs to be compensated. Additionally, damage to environment of the global commons, any activity involving a mere risk of damage, as well as damage to nationals of the launching state and foreign nationals participating in the space operation fall completely outside the scope of the current international space liability regime. Even in relatively unequivocal cases of compensable damage proving the fault and/or the causality required can be impossible.

On balance, the space sector needs a clearer, fairer and more rational liability system. Above all, the allocation of losses within a larger community

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4 Thus far the most famous incident of the type has been the *Cosmos 954* case, where a former USSR nuclear-powered satellite disintegrated over remote northern areas of Canada in 1978. The case was settled by an ad hoc protocol between the two countries in 1981. Protocol between the Government of Canada and the Government of the Union of Soviet Socialist Republics 1981, Apr. 2, 1981, 20 I.L.M. 689. *See more* below. For a more detailed treatment of the *Cosmos 954* case, *see* PHILIPPE SANDS, PRINCIPLES OF INTERNATIONAL ENVIRONMENTAL LAW, 897-898 (2003).

5 Insurance can even represent c. 1/4 of the budget of a space mission. Laurence Ravillon, *Arbitral Disputes in the Space Activities Sector* 7 INT'L BUS. L. J. 801, 814 (2003).

of relevant entities is necessary to balance the competing concerns and retain the economic viability of the space sector, while still securing adequate indemnification for damages. On the one hand, compensation claims for damage resulting from particularly risky activities (even when undertaken with all due care) should be facilitated. On the other, operators of activities that are deemed necessary (or at least socially beneficial) but entail high risks should be shielded from excessive claims.[6]

In areas of human activities analogous to the space sector, liability has often been shared between the producer of damage and society according to different kinds of formulae. This is also called "socialization of risks".[7] For instance, limited liability for ship owners in maritime law has existed since at least the 17th century. Such treatment has been justified by the highly dangerous nature of maritime transport and its necessity for society.[8] Some "socialization of risks" would seem necessary also in the space sector. In this respect the most feasible area to draw inspiration from might not be maritime but nuclear law.

III. CURRENT LIABILITY REGIME OF THE UN SPACE LAW

In principle, the U.N. space treaties provide a party suffering a loss as a result of space activities with a very favourable international liability regime as compared to most other areas of hazardous activities. The general rule, according to Article VI of the Outer Space Treaty,[9] is that states bear international responsibility for activities in space. Article VII, moreover, establishes international liability of launching states. The launching state is

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6 Jutta Brunnée, *Of Sense And Sensibility: Reflections On International Liability Regimes As Tools For Environmental Protection* 53 INT'L & COMP. L. Q. 351, 357 (2004).

7 Guido Fernando Silva Soares & Everton Vieira Vargas, *The Basel Liability Protocol on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wasted and Their Disposal* 12 Y.B. OF INT'L ENVTL. L. 69, 74 (2003).

8 *See* Robin R. Churchill, *Facilitating (Transnational) Civil Liability Litigation for Environmental Damage by Means of Treaties: progress, problems, and prospects,* 12 Y.B. OF INT'L ENVTL. L. 3, 35-36 (2003). It has been argued, however, that in the modern world such special treatment of a particular industry constitutes no longer justifiable subsidies. *Id.*

9 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies, Jan. 27, 1967, 610 U.N.T.S. 205.

liable for damage to another state party or to its natural or juridical persons caused by its space object "or its component parts on the Earth, in air or in outer space, including the Moon and other celestial bodies". The Liability Convention complements these provisions by setting out more detailed rules for cases of "space damage" involving different states.

First, the Liability Convention establishes two separate regimes of liability: one of absolute liability (without any ceiling) to be applied in the case of damage caused by a space object "on the surface of the Earth or to aircraft flight" (Art. II),[10] and another based on fault liability which applies when the damage occurs in outer space (Art. III).[11] All space activities are ultra-hazardous. Therefore it has been deemed appropriate that those engaged in such activities (and gaining profit from them) should also bear the risk of any ensuing damage, whereas possible victims on Earth deserve full compensation. Article V of the Liability Convention improves the possibilities of victims of damage to obtain compensation by establishing joint and several liability of all launching states for joint launches and the right of the victim state to seek the entire compensation from any or all of the launching states.

The intention of the liability regime of all of the U.N. space treaties has indeed been to give a high level of protection to third parties not involved in a space project. Pursuant to the preamble to the Liability Convention, a focal motive for the convention was the "need to elaborate effective international rules and procedures concerning liability for damage caused by space objects and to ensure, in particular, the prompt payment under the terms of this Convention of a full and equitable measure of compensation to victims of

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9 Pursuant to art. VI, exoneration from absolute liability is to be granted "to the extent that a launching State establishes that the damage has resulted either wholly or partially from gross negligence or from an act or omission done with intent to cause damage on the part of a claimant State or of natural or juridical persons it represents", except in cases where the launching state has caused the damage by violating international law. *See* Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies, art. VI.

10 Such inclusion of two parallel systems of liability within a single multilateral convention is quite unusual in international law. Another example is the (not yet in force) Basel Protocol on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wastes and their Disposal, (Dec. 10, 1999) http://www.basel.int/meetings/cop/cop5/docs/prot-e.pdf, *see* art. 4 and art. 5, Silva Soares and Vieira Vargas, *supra* note 7, at 94.

such damage". As is stated in a document called "Advantages of Adherence to the Convention on International Liability for Damage Caused by Space Objects" (produced by a Working Group on the Status and Application of the Five United Nations Treaties on Outer Space under the Legal Subcommittee of the UNCOPUOS), "[b]y concentrating internationally the concept of absolute or objective and unlimited liability for any damage caused by space objects on the surface of the Earth or to aircraft in flight, the [Liability] Convention has become a unique case and a real novelty in contemporary public international law concerning the protection of victims".[12]

However, although this system may, by and large, afford victims of space operations considerable protection, it can appear far less just from the point of view of the states involved in the launch of a space object. Firstly, the Liability Convention does not apply at all to "damage caused by a space object of a launching State to: (a) Nationals of that launching State; (b) Foreign nationals during such time as they are participating in the operation of that space object from the time of its launching or at any stage thereafter until its descent, or during such time as they are in the immediate vicinity of a planned launching or recovery area as the result of an invitation by that launching State" (Art. VII). This limitation obviously excludes many of those most likely to suffer damage in case of an accident. Secondly, a major problem in this respect is the overly extensive definition of a launching state. Pursuant to the Liability Convention, "[t]he term 'launching State' means: (i) A State which launches or procures the launch of a space object; (ii) A State from whose territory or facility a space object is launched (Art. I.c).[13] Hence, most launches will involve several launching states, of which only few typically have a real say in the operation of the space mission. Application of the Liability Convention may thus result in liability of states that are in fact little more than "innocent bystanders".

It may even be complicated to determine which states constitute the launching states under the Liability Convention. Above all, the procurement

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12 *Report of the Legal Subcommittee on the work of its 45th session 2006, held in Vienna from 3 to 13 April 2006,* Annex I, Appendix, para. 3, U.N. Doc. A/AC.105/871 (Apr. 24, 2006).

13 Para. 3 of art. V of the Liability Convention further specifies that a state "from whose territory or facility a space object is launched shall be regarded as a participant in a joint launching". On the concept of launching state, *see also* G.A. Res. 59/115, U.N. Doc. A/RES/59/115 (Jan. 25, 2005).

of the launching of a space object is anything but an unequivocal expression, particularly where space objects launched by private entities are concerned. "Procurement" may be interpreted to include financial backing for a launch, a request by one state to another to launch a satellite of the requester or a private individual or enterprise providing payload for a launch, for instance. Any such link could cause a country to be considered a "launching state". Even state members of an international organization requesting the launch services of some state could be considered states "procuring" the launch of a space object. On the other hand, such activities as supplying minor components to the payload or the sale of a satellite should not be enough to qualify as "procurement".[14] The Liability Convention does not, however, define the concept in detail. Particularly in light of the rapid development of launching technology and privatization of the space sector, the definition of the term "launching state" is increasingly insufficient.[15]

Application of the UN space treaties may, thus, result in somewhat questionable outcomes. The Liability Convention also regulates situations where damage is caused "elsewhere than on the surface of the Earth to a space object of one launching State or to persons or property on board such a space object by a space object of another launching State, and of damage thereby being caused to a third State or to its natural or juridical persons", in which case "the first two States shall be jointly and severally liable to the third State" (Art. IV.1). In principle, this means that, for instance, if a piece of space debris hits a spacecraft of another state and this causes further damage to a third state, both the launching state of the debris (where its identity can be established) and that of the ("innocent") spacecraft damaged by it are jointly and severally liable for possible damage to any other states. In the case of damage which occurs in outer space, fault liability applies (Art. IV.1.b),

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14 Carl Q. Christol, *Protection of the Space Environment - Debris and Power Sources in* THE USE OF AIRSPACE AND OUTER SPACE FOR ALL MANKIND IN THE 21ST CENTURY – PROC. OF THE INT'L CONF. ON AIR TRANSPORT & SPACE APPLICATION IN A NEW WORLD 253, 271-272 (1993).

15 *Review of the Status of the Five International Legal Instruments Governing Outer Space*, para. 11.c, Working paper submitted by Germany on behalf of Austria, Belgium, Czech Republic, Denmark, Finland, France, Greece, Hungary, Ireland, Italy, Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, Switzerland and the United Kingdom of Great Britain and Northern Ireland, UNCOPUOS Legal Subcommittee 37th session, Mar. 23 – Apr. 3, 1998, U.N. Doc. A/AC.105/C.2/L.211/Rev.1 (March 30, 1998).

whereas for damage on Earth (or to aircraft in flight) liability is absolute (Art. IV.1.a). If a spacecraft with a nuclear power source (NPS) is involved and parts of it fall back to Earth, the damage may be very grave and the ensuing absolute liability accordingly significant. Moreover, the victims are allowed to ask for full compensation from any one of the liable states, who are then to apportion it between themselves according to fault (Art. IV.2). Consequently, if there is no fault on behalf of the launching state of the NPS-equipped spacecraft but only on the part of the launching state of the piece of debris (no matter how small that piece is), the latter is to pay all of the compensation pursuant to the Liability Convention.[16] Even in such a case, the victims of damage on Earth can, on the other hand, legitimately demand the entire compensation from the innocent state, which may eventually encounter difficulties in collecting it from the state at fault (despite its undeniable right to do so pursuant to the Liability Convention).

As concerns the amount of reparation for damage, Article XII provides that compensation for harm caused by space activities shall "provide such reparation in respect of the damage as will restore the person, natural or juridical, State or international organization on whose behalf the claim is presented to the condition which would have existed if the damage had not occurred". This standard could result in very high damages, particularly in the case of harm to the health or lives of people. On the other hand, the very general reference in Article XII to "international law and the principles of justice and equity" for determining the compensation is open to a variety of interpretations. The preamble to the Liability Convention states equally ambiguously that the payment should be "a full and equitable measure of compensation". Damage is, moreover, only compensable if it results in "loss of life, personal injury or other impairment of health; or loss of or damage to property of States or of persons, natural or juridical, or property of international intergovernmental organizations" (Art. I.a). This excludes any damage to the environment itself, whether occurring in outer space or on Earth in areas outside the national sovereignty of states. Hence, a potential polluter does

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16 This illustrative example has been presented by Armel Kerrest, *Space Debris, Remarks on Current Legal Issues* PROC. OF THE THIRD EUROPEAN CONF. ON SPACE DEBRIS 869, 870-871 (2001). The author suggests that liability rules should be amended so as to avoid outcomes where damage resulting from nuclear pollution is not compensated by the user of the NPS. *Id.* at 873.

not need to worry much about environmental losses, even when they can affect the environment significantly, as long as there is no damage to "foreign" property or persons. As mentioned above, the Liability Convention also restricts its scope by excluding damage caused to citizens of the same country which launched the space object in question, as well as to foreign nationals participating in that space operation (Art. VII). Furthermore, under Article III, persons (as well as property) must be on board a space object in order to recover damages, a condition which in principle would, for instance, exclude incidents in which astronauts engaged in extravehicular activities are killed.

It is also questionable whether the Liability Convention's "damage" actually covers anything but clearly material damage. If it is interpreted to include only strictly material damage, instances like interference caused by telecommunication satellites to space activities of others would, at worst, not fall under the scope of the Liability Convention's provisions at all.[17] Moreover, the ambiguous terminology of the Liability Convention can even be interpreted to exclude all damages caused by space debris: it applies to damage "caused by a space object" and the only definition Article 1.d gives for a space object is that it includes "component parts of a space object as well as its launch vehicle and parts thereof". Such a definition is very vague, being nearly no definition at all. This provision appears to refer to space objects that are entire units, extending at most to component parts (also unitary) thereof.[18] There seems to be no great difficulty in designating inactive satellites as well "space objects". The situation gets most complicated in the case of little pieces of debris, as one can argue that such an item constitutes neither a space object nor a component part of one (nor a launch vehicle or a part thereof). It seems especially debatable whether a piece of fragmentation debris and micro-particulate matter can be regarded as a "space object" or a "component part". Even less clear is the situation with other types of pollution

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17 *See* Carl Q. Christol, *Protection of Space from Environmental Harms* 4 ANNALS OF AIR & SPACE L. 433, 447-450 (1979).

18 The provision has even been interpreted as dealing with not only entire but preferably fully operating units, i.e., "functioning unitary entities". Christol, *supra* note 14, at 256. (According to the author, harms produced by space debris nevertheless invoke liability under the existing treaty regime. *Id.*)

and contamination, including space mission litter. Questions have also been presented regarding the legal status of rockets that never reach outer space, for instance, due to a launch failure.[19]

However, if space debris does not qualify as a space object for the purposes of the Liability Convention, the instrument becomes largely meaningless in establishing liability for space activities. The most common and hazardous form of potential damage related to space activities would then fall wholly outside the scope of any international legal regulation.[20] Consequently, it has been argued that "anything which has been launched into outer space whatever its size" qualifies as a "space object".[21] Alternatively, space debris can even be regarded as a "component part" of a space object.[22] Such a practical approach with a focus on safety and environmental concerns – by considering space debris as constituting either a space object or at least a component part of it – seems to be the only feasible interpretation given the hazards space debris poses today.[23] The question of a legal distinction between a valuable spacecraft and worthless space debris obviously still requires serious consideration. If space debris should be defined as a space object under the U.N. space treaties, it has been recommended that an additional protocol be elaborated for determining exactly which provisions of the space treaties apply to space

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19 Howard A. Baker, *Liability for Damage Caused in Outer Space by Space Refuse* 13 ANNALS OF A. & SPACE L. 183, 209 (1988). It has been pointed out that if an object simply ceases to be functional, this should have no influence on its legal status. The fact that even an attempted launch qualifies as "launching" under the Liability Convention (art. I.b) also seems to support the conclusion. See GEORGE T. HACKET, FORUM FOR AIR AND SPACE LAW VOLUME 2: SPACE DEBRIS AND THE CORPUS IURIS SPATIALIS 58 (Marietta Benkö & Willem de Graaff eds., 1994).

20 On technical aspects of space debris in more detail, *see* LOTTA VIIKARI, THE ENVIRONMENTAL ELEMENT IN SPACE LAW: ASSESSING THE PRESENT AND CHARTING THE FUTURE 31-45 (2008).

21 *See* Kerrest, *supra* note 16, at 870 and 873 footnote 1. *See also* the *European Code of Conduct for Space Debris Mitigation,* (June 28, 2004) http://www.stimson.org/wos/pdf/eurocode.pdf. The Code of Conduct defines *space debris* as "[a]ny man made space object including fragments and elements thereof, in Earth orbit or re-entering the Earth's atmosphere, that is non-functional", and *space object* as "[a]ny man-made space system and any of its components or fragments" The *Code of Conduct*, *ibid*. at 13-14.

22 This is the position taken in *The Report of the ESA Space Debris Working Group* 67 (Nov. 1988).

23 One explanation presented for the lack of a substantive definition of the term "space object" in the Liability Convention (and other UN space treaties) is that there was a common understanding of the meaning of the term at the time these instruments were drafted. *See* HACKET, *supra* note 19, at 56-57. For a discussion concerning the notions "damage" and "space object" in UN space treaties, *see*, *e.g., Report of the 64th Conference of the ILA* 164-167 (1991).

debris and which to valuable space objects. If space debris is not deemed to be a space object, the protocol could determine when it is perhaps permissible to remove or re-orbit space debris in order to prevent collisions or close encounters with functional spacecraft.[24]

Regardless of the interpretation of "space object", mere activity involving a risk of damage, no matter how hazardous, can never result in liability under the provisions of the U.N. space treaties. Moreover, even in cases of indisputable material damage, proving the fault and the causality required is often an insurmountable obstacle. For instance, even if debris particles of all sizes were included in the legal definition of a "space object", great practical difficulties would remain in establishing liability of the launching state. In most cases, it is almost impossible to prove in a given case that the damage was even caused by space debris, that a particular piece of debris is part of a registered space object of a certain state and, furthermore, that there exists such fault (when the incident takes place in outer space) on the part of the launching state that it can be held liable for the damage.[25] More generally, there are obvious difficulties involved in establishing any fault when standards of conduct for handling the environmental hazards of space activities have yet to be adopted.[26] This seems problematic particularly in the case of damage caused by space debris. Moreover, it is very difficult, if not impossible, to ascertain what kind of damage certain debris can cause, let alone when a particular form of damage will occur. Even where some kind of a prediction of a possible collision can be made, there rarely exists any possibility of carrying out manoeuvres to avoid it. Not surprisingly, the rationale for fault-based liability for damage caused in outer space has been frequently questioned.[27]

Thus far the only claim that has ever been presented under the Liability Convention has been that of Canada in the *Cosmos 954* case, where a former

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24 *See* INTERNATIONAL ACADEMY OF ASTRONAUTICS, COSMIC STUDY ON SPACE TRAFFIC MANAGEMENT 15 (Corinne Contant-Jorgenson, Petr Lála & Kai-Uwe Schrogl eds., 2006).

25 The situation is typically less complicated where damage is caused by space debris falling down to Earth: there is no need to establish fault because the absolute liability regime applies and, moreover, objects that are capable of entering the Earth atmosphere tend to be large and heavy and thus more likely to be identifiable. *See* Kerrest, *supra* note 16, at 870.

26 Nicolas M. Matte, *Environmental Implications and Responsibilities in the Use of Outer Space* 14 ANNALS OF AIR & SPACE L. 419, 435 (1989).

27 *E.g.,* Baker, *supra* note 19, at 214-215; HACKET, *supra* note 19, at 211-212.

USSR nuclear-powered satellite disintegrated over remote northern areas of Canada in 1978. The Canadian claim for some 6 million Canadian dollars was based on the Liability Convention, the Outer Space Treaty and general principles of international law.[28] It covered, *inter alia*, the costs of restoring the territory rendered partly unfit for use by radioactive debris scattered over large areas, hence constituting damage to property within the meaning of the Liability Convention.[29] Canada also reserved the right to present additional claims, e.g., for compensation for the costs of establishing a Compensation Commission under the Liability Convention. Eventually, however, the dispute was not resolved by invoking the Liability Convention but by a protocol between the two states in 1981.[30] The Soviet Union agreed to pay 3 million Canadian dollars "in full and final compensation" which Canada in turn accepted "in full and final settlement of its claim".[31] However, the *Cosmos 954* case provides an interesting precedent in one important respect concerning the interpretation of the Liability Convention: at least in this incident "space debris" was evidently considered a "space object" as it sufficed, in the light of the initial Canadian claim, to establish liability under the Liability Convention.[32] On the other hand, it can be argued that the case only supports the conclusion that particularly hazardous (radioactive) space debris constitutes a "space object" under the UN space law. Besides, the Soviet Union never officially admitted liability.[33]

IV. NUCLEAR LIABILITY

As has been explained above, the current international space liability system as established by the UN Liability Convention is far from satisfactory.

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28 *Statement of the Canadian Claim*, paras. 14-24, 18 I. L. M. 899 (1979).

29 The total costs of the Canadian government were apparently much higher, however (some 14 million Canadian dollars); what is more, the US helped with the cleanup operations. Jason Reiskind, *Toward a Responsible Use of Nuclear Power in Outer Space: the Canadian initiative in the United Nations* 6 ANNALS OF AIR & SPACE L. 461, 463 (1981).

30 *Supra* note 4.

31 For a more detailed treatment of the *Cosmos 954* case, *see* SANDS, *supra* note 4, at 897-898.

32 However, the Soviet Union never officially admitted liability and the dispute was ultimately not resolved by invoking the Liability Convention. Besides, it can be argued that the case only supports the conclusion that particularly hazardous (radioactive) space debris constitutes a "space object" under the UN space law. Baker, *supra* note 19, at 211-213.

33 Baker, *supra* note 19, at 211-213.

There is no question about whether it needs to be improved or not – the question is merely how long we can afford to live without a better system. Thus far the space sector has been spared of considerable damaging incidents but as soon as a major accident necessitating a feasible space liability system occurs, we will most likely be in trouble in terms of liabilities. Creating a better space liability system may not be an easy task, yet an imperative one. It would be wise to try to learn from the solutions of similar areas of human activity while we still have time. The setting in the space sector seems, in many respects, similar in particular to that in the use of nuclear power, which also entails significant risks. There the solutions adopted include a three-tiered system of compensation with absolute but limited liability of the operator of a nuclear installation, coupled with limited liability of the state in which the installation is located, and an international compensation fund.

This is the system of liability sharing in Western Europe, which is embodied in several instruments, starting with the OECD's Paris Convention on Third Party Liability in the Field of Nuclear Energy[34] of 1960 and the IAEA's Vienna Convention on Civil Liability for Nuclear Damage[35] of 1963, the former of which was strengthened by the Brussels Supplementary Convention[36] in 1963. These were the first treaties to facilitate international civil liability claims for environmentally harmful activities.[37] Most Western European countries are parties to these conventions which were linked in 1988 by a Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention[38] that combined the two into one expanded liability regime.

In its first tier, this regime combines operator liability and insurance obligations. The system is based, at the first level, on strict (absolute) liability

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34 Convention on Third Party Liability in the Field of Nuclear Energy, as amended by the additional Protocol of 28th January 1964 and by the Protocol of 16th November 1982, July 29, 1960, 956 U.N.T.S. 264.

35 Convention on Civil Liability for Nuclear Damage, May 21, 1963, 1063 U.N.T.S. 265.

36 Convention of 31st January 1963 Supplementary to the Paris Convention of 29th July 1960, as amended by the additional Protocol of 28th January 1964 and by the Protocol of 16th November 1982, Jan. 31, 1963, 1041 U.N.T.S. 358.

37 The Paris Convention is regional in scope, whereas the Vienna Convention is a global treaty.

38 Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention, Sept. 21, 1988, 1456 U.N.T.S. 101.

of the operator of a nuclear installation, whereby there is no need to prove fault or negligence.[39] Although irrespective of fault, liability of the nuclear installation operator is qualified by limitations on the amount of compensation to be paid and time. According to the Vienna Convention, "[t]he liability of the operator may be limited by the Installation State to not less than US $5 million for any one nuclear incident" (Art. V). Furthermore, the Paris Convention set a maximum liability of 15 million Special Drawing Rights (SDRs, as defined by the International Monetary Fund),[40] which was increased by the Brussels Supplementary Convention up to 300 million SDRs (Art. 3).[41] In order to secure indemnification for damages, the operator is required to maintain insurance (or other form of financial security) covering its liability.[42] This has resulted in national insurance pools where several insurance companies contribute to cover a small part of the liability of an operator, as the capacity for individual insurers to cover nuclear risks is usually limited.[43] In addition to limitations on amount, the liability of a nuclear installation operator is limited in time: a general rule is that compensation rights are extinguished if damage claims are not instituted within ten years.[44] The 10-year period was set because insurance usually is not available for longer.[45] A 1997 Protocol to Amend the Vienna Convention on Civil Liability

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39 *See* the Vienna Convention, art. II and the Paris Convention, art. 3. An exception to this is "damage caused by a nuclear incident directly due to an act of armed conflict, hostilities, civil war, insurrection" or "a grave natural disaster of an exceptional character" (unless the law of the installation state provides to the contrary). *See* the Vienna Convention, art. IV.3 and the Paris Convention, art. 9.

40 States may also establish by national legislation greater or lesser amounts of operator liability (though not less than five million SDRs; art. 7.b). Most states have set such national limits. Churchill, *supra* note 8, at 8.

41 300 million SDRs is currently equal to about 470 million US dollars. For more about the SDR, *see* http://www.imf.org/external/np/exr/facts/sdr.htm. For the daily USD value of an SDR, *see* http://www.imf.org/external/np/fin/data/rms_sdrv.aspx. The 1997 Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage also sets a 300-million-SDR limit on the operator´s liability. *See* Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage, Sept. 12, 1997, 36 I.L.M. 1462 (1997), art. 7.

42 *See* the Paris Convention, art. 10 and the Vienna Convention, art. VIII.

43 For more details about the operation of such national insurance pools, *see* Tom Vanden Borre, *Are nuclear operators liable and insured in case of an Act of Terrorism on a Nuclear Installation or Shipment? Rethinking Nuclear Energy and Democracy after 09/11*, Presented at a Symposium organized by PSR/IPPNW in Switzerland (2002), http://www.ippnw.ch/content/pdf/Sympo_26042002/VandenBorre.pdf.

44 *See* the Paris Convention, art. 8 and the Vienna Convention, art. VI.

45 Churchill, *supra* note 8, at 9.

for Nuclear Damage (see more below) introduced an extended period of 30 years for presenting claims for death and personal injury (Art. 8). This seems quite reasonable, considering for instance that cancers may materialize relatively slowly after the actual exposure to radiation.[46]

On the second tier, the risks from the use of nuclear energy are borne by the state in which the nuclear installation is located: above the operator's limit of liability, claims are covered by supplementary public funds of the installation state up to a total of 175 million SDRs.[47] For damages exceeding this limit, there is a further third tier – an international compensation fund to which the convention parties jointly contribute in proportion to their installed nuclear capacity and gross national product (GNP).[48] The limit on damages which the international fund will cover is 125 million SDRs (thus the total compensation available from all sources is 300 million SDRs).[49] This third tier is a form of international collective loss sharing which, by taking into account the amount of nuclear capacity of contracting states, partly also emphasizes the idea of making the polluter pay. The primary liability of the nuclear installation operator obviously derives from the same principle. Nevertheless, it has been asserted that the basic concept behind this liability regime is actually not that of the polluter-pays principle but rather an equitable sharing of the risk of ultra-hazardous activities, which also involves an element of state subsidy.[50]

The system of the Vienna and Paris Conventions met with criticism for its failure to cover purely environmental damage, for instance.[51] A significant amendment to the system was introduced in 1997 by a Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage. Among other

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46 Churchill, *supra* note 8, at 11.

47 *See* the Brussels Supplementary Convention, art. 3.b.

48 Under the Brussels Supplementary Convention, contributions to the international fund are based (50 per cent) on the ratio between the GNP of each states party and the total of the GNPs of all of them for the year preceding the nuclear incident, and (50 per cent) on the ratio between the thermal power of the reactors in the territory of each party and the total thermal power of the reactors sited in all of them (art. 12.a).

49 *See* the Brussels Supplementary Convention, art. 3.b.iii.

50 *See* PATRICIA W. BIRNIE & ALAN E. BOYLE, INTERNATIONAL LAW & THE ENVIRONMENT 94 (2002).

51 *See* Churchill, *supra* note 8, at 10-11.

things, the protocol broadened the definition of nuclear damage to include environmental damage and preventive measures: the new definition refers specifically to economic loss, the cost of measures to reinstate a significantly impaired environment, loss of income resulting from that impaired environment and the cost of preventive measures (Art. 2.2) – all of which are likely to constitute major parts of damage resulting from a serious nuclear incident.[52] The 1997 protocol also increased the limit of operator liability under the Vienna Convention to 300 million SDRs (of which a maximum of 150 million may be paid from public funds if the installation state so wishes) and simplified the procedure for amending the liability limits in the future (Art. 7). Moreover, the protocol extended the geographical scope of the Vienna Convention to "apply to nuclear damage wherever suffered" (Art. 3).[53] However, although in force, this protocol has thus far gained only five members.[54]

In 1997, another instrument dealing with compensation, the Convention on Supplementary Compensation for Nuclear Damage[55] was adopted. This free-standing treaty offers the possibility of a global nuclear regime in that it can be adhered to by all states regardless of whether they are parties to any existing nuclear treaties (or have nuclear installations on their territories).[56] It presents, for instance, a new formula (building upon the 1963 Brussels Supplementary Convention) for joint state contributions to the retrospective

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52 *Nuclear Energy Agency, Background Information Note For The Press Communiqué On The Revision Of The Paris Convention On Nuclear Third Party Liability And Of The Brussels Supplementary Convention*, Press Communiqué (Feb. 10, 2004), http://www.nea.fr/html/general/press/2004/2004-01-note.html.

53 However, a state party may decide to exclude (by national legislation) from the application of the Vienna Convention "damage suffered (...) in the territory of a non-Contracting State; or (...) in any maritime zones established by a non-Contracting State in accordance with the international law of the sea" provided that this non-Contracting State at the time of the nuclear incident "has a nuclear installation in its territory or in any maritime zones established by it in accordance with the international law of the sea; and (...) does not afford equivalent reciprocal benefits" (art. 3).

54 The ratifying states are Argentina, Belarus, Latvia, Morocco and Rumania. In addition there are 10 other signatory states.

55 Convention on Supplementary Compensation for Nuclear Damage, Sept. 12, 1997, http://www.iaea.org/Publications/Documents/Conventions/supcomp.html (not yet in force).

56 However, a state not party to the Paris Convention or the Vienna Convention must have comparable national legislation. If a state has civilian nuclear power plants, it must also be a party to the Convention on Nuclear Safety *see* arts. XVIII-XIX, June 17, 1994, 33 I.L.M. 1514 (1994).

international fund for amending nuclear accidents.[57] Pursuant to the formula, states would contribute funds in accordance with their nuclear capacity and an amout based on the ratio of their contributions to the UN budget (Art. IV.1). However, this convention is not yet in force.[58]

In 2004, the contracting parties to the Paris and Brussels Conventions signed protocols[59] to amend the instruments which increased their compatibility with the IAEA Conventions amended/adopted in 1997. Like the Vienna Convention as amended by the 1997 protocol to it, the revised Paris Convention contains a detailed definition of "nuclear damage", allowing for a broader range of damage to be compensated than the previously existing categories of personal injury and damage to property only (Art. I.a.vii.). Equally important was the expansion of the geographical scope of the convention: the revision allows for victims in more countries to be compensated in case of a nuclear accident with trans-boundary implications.[60]

The most important change introduced by the amending protocol, however, was the substantial increase in the three tiers of compensation of the Brussels Supplementary Convention: the new limits of liability set by the protocol are a minimum of 700 million Euros for the nuclear installation operator, a maximum of 500 million Euros for the installation state, and a collective state contribution of at most 300 million Euros (Art. 3, paras. a-b.). The resulting total of 1.5 billion Euros is a considerable increase over the previous SDR amounts established by the Brussels Supplementary Convention (approximating a total of 350 million Euros only). Beyond this new available total compensation, it is at least tacitly assumed that the installation state

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57 Pursuant to this formula, states would contribute funds in accordance with their nuclear capacity and an amout based on the ratio of their contributions to the UN budget (art. IV.1).

58 It has gained only four ratifications (by Argentina, Morocco, Rumania and the USA).

59 Protocol to amend the Convention On Third Party Liability In The Field Of Nuclear Energy of 29th July 1960, as amended by the additional protocol of 28th January 1964 and by the protocol of 16th November 1982, the Paris Convention, Feb. 21, 2004, http://www.nea.fr/html/law/paris_convention.pdf, and Protocol to amend the convention of 31st January 1963 Convention of 29th July 1960 on third party liability in the field of nuclear energy, as amended by the additional protocol of 28th January 1964 and by the protocol of 16th November 1982 (Brussels Supplementary Convention), Feb. 21, 2004, http://www.nea.fr/html/law/brussels_supplementary_convention.pdf.

60 Compare the original art. 2 of the Paris Convention and the same article as amended by the protocol.

will cover any damage in excess of the 1.5 billion Euros.[61] The 2004 protocol also changed the convention's unit of account to Euro, to avoid fluctuations in the value of the SDR.[62]

V. OTHER LIABILITY REGIMES

Another interesting precedent for the space sector is provided by the liability system of the International Convention on Liability and Compensation for Damages in Connection with the Carriage of Hazardous and Noxious Substances by Sea,[63] which establishes the "International Hazardous and Noxious Substances Fund" (Art. 13) to provide compensation (up to 250 million SDR per incident) for damage which is not compensated in the first tier by ship owners.[64] The fund is financed by contributions from the importers and receivers of cargo containing hazardous or noxious substances. The convention has not, however, received enough ratifications to enter into force.[65]

A related system is that established by the International Convention on Civil Liability for Oil Pollution Damage[66] and the complementary International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage,[67] according to which supplementary funds for compensation of damages are provided by the oil industry, i.e., all persons receiving oil by sea in contracting states (Art. 10 *et seq.*). Unlike in the context of nuclear liability, there have been many claims pursued under

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61 Uranium Information Centre, *Civil Liability for Nuclear Damage*, UIC Nuclear Issues Briefing Paper # 70 (May 2006), http://www.uic.com.au/nip70.htm.

62 S*ee Nuclear Energy Agency*, *supra* note 52. Furthermore, the protocol altered the shares which provide the basis of joint state contributions to the international fund: 65 per cent based on installed nuclear generating capacity and 35 per cent on the ratio between the GNP of each contracting party and the GNPs of all of them (art. 12.a).

63 Convention on Liability and Compensation for Damages in Connection with the Carriage of Hazardous and Noxious Substances by Sea, May 3, 1996 (not yet in force), 35 I.L.M. 1415 (1996).

64 Art. 14.5. In accordance with this system, liability is shared in the first tier between the ship owner and the receiver of the cargo (art. 7). Insurance is compulsory (art. 12). There are sliding-scale limits on liability, depending on the ship tonnage (art. 9).

65 For a more detailed account of the convention, *see*, *e.g.,* Churchill, *supra* note 8, at 21-22; Silva Soares & Vieira Vargas, *supra* note 7, at 82-84.

66 Convention on Civil Liability for Oil Pollution Damage, Nov. 29, 1969, 973 U.N.T.S. 3.

67 Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, Dec. 18, 1971, 1110 U.N.T.S. 57.

the international oil pollution liability regime, both against ship owners and the Fund.[68]

One more example is the Basel Protocol on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wastes and their Disposal,[69] which also has yet to enter into force. Again, there is strict liability, balanced by a liability ceiling (Arts. 4, 12; Annex B). Moreover, there is a time limit for claims, either ten years from the incident (Art. 13.1) or five years "from the date the claimant knew or ought reasonably to have known of the damage" (Art. 13.2). Fault liability applies when damage is caused by non-compliance with the Basel Convention or by "wrongful intentional, reckless or negligent acts or omissions" (Art. 4). In such cases also the liability ceilings of the system are not applicable (Art. 12.2). Insurance or other financial security is required (Art. 14).[70] The system includes a trust fund mechanism, the Technical Co-operation Trust Fund, which is maintained by voluntary contributions. It is, however, not a compensation fund for covering damage that exceeds the liability limits of the protocol;[71] the protocol only provides that, "[w]here compensation under the Protocol does not cover the costs of damage, additional and supplementary measures aimed at ensuring adequate and prompt compensation may be taken using existing mechanisms" (Art. 15.1), with these including the Technical Co-operation Trust Fund. The second paragraph of the article further states that, "[t]he Meeting of the Parties shall keep under review the need for and possibility of improving existing

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68 Churchill, *supra* note 8, at 19. For a more detailed treatment of international liability and the fund system in oil pollution, *see, e.g.*, SANDS, *supra* note 4, at 912-923. For an informative assessment of conventions concerning liability for pollution from ships, *see* Churchill, *supra* note 8, at 15-22.

69 Basel Protocol on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wastes and their Disposal, Dec. 10, 1999 (not yet in force), http://www.basel.int/meetings/cop/cop5/docs/prot-e.pdf.

70 Another very similar system is that provided by the 2003 Protocol on Civil Liability and Compensation for Damage Caused by the Transboundary Effects of Industrial Accidents on Transboundary Waters, which provides for strict operator liability (art. 4) with liability ceilings (art. 9 and Annex II) and time-limits for claims (art. 10), as well as fault liability in case of "wrongful intentional, reckless or negligent acts or omissions" (art. 5). Protocol on Civil Liability and Compensation for Damage Caused by the Transboundary Effects of Industrial Accidents on Transboundary Waters to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes and to the 1992 Convention on the Transboundary Effects of Industrial Accidents, May 21, 2003 (not yet in force), available at http://www.unece.org/env/civil-liability/documents/protocol_e.pdf.

71 The liability limits are in Annex B.

mechanisms or establishing new mechanisms". During the negotiations, developing and developed states were in disagreement over the need to establish an international fund for complementing inadequate compensation. The outcome of the disagreement was the obscure Article 15.[72]

The channelling of liability directly to the actual operators has often encountered resistance. An example set in another context is the 1993 Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment (Lugano Convention),[73] which was negotiated under the auspices of the Council of Europe. The Lugano Convention applies generally to all potentially environmentally harmful activities and envisages, in principle, strict and unlimited liability of operators.[74] In order to secure compensation, it requires states to ensure that operators conducting dangerous activities in their territory have appropriate insurance or other financial security (Art. 12). Initially, the idea was to develop a complementary instrument concerning an additional compensation fund (similar to the fund established for compensation for oil pollution damage). However, due to the reluctance of states to adhere to the Lugano Convention, this plan has been put aside.[75] Nevertheless, the convention has not managed to receive even the three ratifications required for it to enter into force (Art. 32.3).

One more example of a system of strict liability of the operator (combined with mandatory insurance requirements; Arts. 13-17) is that of the 1989 Convention on Civil Liability for Damage Caused during Carriage of Dangerous Goods by Road, Rail and Inland Navigation Vessels.[76] This convention provides for limits of liability though (Arts. 9-12). Nevertheless, it has thus far only one State party (Liberia) and has thus also not entered into force.

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72 Silva Soares & Vieira Vargas, *supra* note 7, at 94. For a more detailed treatment of the history of the Basel Protocol, *see id.*

73 Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment, June 21, 1993 (not yet in force), 32 I.L.M. 1228 (1993).

74 Chapter II. There are exemptions in art. 8, though.

75 Churchill, *supra* note 8, at 27-28.

76 Convention on Civil Liability for Damage Caused during Carriage of Dangerous Goods by Road, Rail and Inland Navigation Vessels, Oct. 10, 1989, http://www.unece.org/trans/danger/publi/crtd/doc/crtd_e.doc (not yet in force).

VI. A PROPOSAL FOR AN IMPROVED SPACE LIABILITY REGIME

Given the potential for massive adverse impacts caused by space activities, this sector would need feasible and functional risk management just as the other areas of human activity entailing risks of similar severity. This should include clear allocation of the burden of compensation between private and governmental stakeholders within a system where the victim of harm can easily, and without excessive cost, identify the entity from which to demand reparation in the first instance. From the point of view of anyone suffering damage the latter is essential; from the point of view of the space industry, the former.

Obviously, compensation for the victims of accidents and other negative consequences of space activities cannot be guaranteed simply by making the immediate actor at fault pay; the polluter-pays principle does not work very well in the space sector. The reasons have been explained above in more detail. They include the problems of potentially very high damages, as well as questions of proof and establishing fault (when damages taking place in outer space are concerned). Instead, tiered systems and collective loss-sharing arrangements similar to those adopted in other fields of high-risk activities internationally could prove useful in channelling the risks and ensuring means for adequate compensation.

One tool for achieving a balance between interests of the various stakeholders in the space sector might be an international 'space damage fund' or similar instrument that takes into account the extent of states' space activities as well as their economic situation.[77] When designing such a system, one needs to keep in mind the developing countries' demand that it is the space faring nations who should bear the costs of their activities. At the national level as well, those gaining the economic benefits of space activities ought to bear the primary responsibility. A system which does not appear fair both internationally and nationally would be unable to create much incentive to comply with the rules.

Hence, a mechanism similar to the post-disaster compensation regime of the nuclear sector in Western Europe could be one option. The first tier would

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77 Motoko Uchitomi, *Sustainable Development in Outer Space - applicability of the concept of sustainable development to space debris problems* PROC. OF THE FORTY THIRD COLLOQUIUM ON THE L. OF OUTER SPACE 71, 77-78 (2000).

consist of strict operator/owner liability with compulsory insurance (or other financial security). It has been argued, however, that the common requirement in civil liability treaties of insurance coverage for the full limit of operator liability – even where this is restricted to a certain sum – may not necessarily be an advantageous one. At worst, it could discourage damage prevention as liability is covered by insurance in any case. On the other hand, if the safety record and practices of operators directly affected the terms of insurance, this would encourage (or even require) them to act more cautiously.[78] Hence, the introduction of absolute but limited operator liability with obligatory insurance could optimally prove quite useful.

Operator liability (and the insurance to cover it) would then be backed up by supplementary state liability and, ultimately, by an international joint state fund. The international fund could be financed by contributions based on economic factors as well as the amount of space activities. Such a system seems fair in many ways. It does not burden an individual operator with excessive liability, yet clearly directs liability towards it that is commensurate with its control over and benefits derived from the hazardous activities. At the same time, it secures compensation by resorting to the next tiers if needed. In addition, the level of state liability and the international fund would be constructed in a way that takes cognizance of states' actual role in space activities as well as their economic capacity. Again, perceived fairness is essential.

In cases where the liable entity remains unknown, the entire reparation for damage should come from the international fund. This would be very useful where damage caused by debris that cannot be traced back to any launching state is concerned, for instance.[79] With the compensation fund as

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78 *See* Churchill, *supra* note 8, at 36.

79 For a proposal for a fund which would cover damage caused by unknown debris, *see* Kerrest, *supra* note 16, at 870; JOEL S. GREENBERG, ECONOMIC PRINCIPLES APPLIED TO SPACE INDUSTRY DECISION 395 (2003); Nandasiri Jasentuliyana, *Strengthening International Space Law: the role of the United Nations* PROC. OF THE THIRD ECSL COLLOQUIUM ON INT'L ORGANISATIONS AND SPACE L. 87, 91 (1999). Some decades ago, a proposal was made for a fund to cover only damage caused by re-entering, unidentifiable space objects impacting the Earth. *See* Paul G. Dembling & Swadesh S. Kalsi, *Pollution of Man's Last Frontier: Adequacy of Present Space Environmental Law in Preserving the Resource of Outer Space*, XX NEDERLANDS TIJDSCHRIFT VOOR INTERNATIONAAL RECHT 125, 145 (1973). The establishment of an international fund to compensate victims of damage caused by space objects has also been suggested in Bruce A. Hurwitz, *An International Compensation Fund for Damage Caused by Space Objects* PROC. OF THE THIRTY-FOURTH COLLOQUIUM ON THE LAW OF OUTER SPACE 201 (1992).

only the last resort, disadvantages related to such funds, e.g., a diminished preventive effect, are also minimized.[80] In addition to state resources, the international fund could be augmented also by the space industry.[81]

VII. LESSONS TO LEARN

In addition to utilizing liability regimes of areas similar to the space sector as technical models when designing a new space liability regime it is, however, of utmost importance that also the shortcomings of the other liability systems are thoroughly examined. The different kinds of civil liability treaties outside the space sector have been criticized for not providing compensation in cases of damage to non-economic components of the environment when restoration is not possible (irreparable ecological damage), for instance. Even where damage is in principle compensable, it may not be fully compensated, either due to limits of liability or because the funds available eventually prove insufficient. Another problem seems to be that many liability systems do not address adequately the problems in establishing a causal link between the damage and the harmful activity suspected of having caused it.[82] Causality presents a considerable challenge for any space-related liability regime as well.

Nevertheless, in practice, there are few other possibilities than international funds for providing even somewhat adequate compensation for damage in case of a major space accident. This limitation is obviously due to the extent of damage but also to the likely difficulties in even identifying the liable entity, or the 'launching state' with substantial enough connection with the damage, and, moreover, establishing fault. As explained above, a fund could be harnessed for providing compensation even in cases where the source of damage cannot be identified or fault established.

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80 For an assessment of the potential disadvantages of compensation fund systems, *see* NICOLAS DE SADELEER, ENVIRONMENTAL PRINCIPLES: FROM POLITICAL SLOGANS TO LEGAL RULES 59 (2002); Alan E. Boyle, *Making the Polluter Pay? Alternatives to State Responsibility in the Allocation of Transboundary Environmental Costs*, *in* INTERNATIONAL RESPONSIBILITY FOR ENVIRONMENTAL HARM 363, 363 (Francesco Francioni & Tullio Scovazzi eds., 1991). It should be noted, moreover, that some states have abstained from ratifying the Vienna Convention and Paris Convention examined above, because it may be possible to obtain greater compensation for nuclear damage outside this regime through national legislation. *See* Churchill, *supra* note 8, at 9-10.

81 Churchill, *supra* note 8, at 40.

82 Churchill, *supra* note 8, at 34-35, 37-38.

However, a fund cannot operate without funds. Accordingly, the space faring nations might not be too receptive to such ideas as they could be placed under an obligation to make available significant amounts of money for potential damage reparation. Considering the precedents from other areas of international activities, prospects for a 'space damage fund' seem increasingly bleak: most of the above-mentioned civil liability systems with compensation funds (with the exception of the oil pollution compensation mechanisms) have either not entered into force at all or have done so to a limited extent only. A liability system which is in force on a low level of commitment or just between few or relatively irrelevant contracting states can be worse than no liability system at all. At least it is likely to remain of little consequence.

In practice, the industrialized states have succeeded in furthering their agendas while the priorities of less developed states have been largely ignored. One example is the negotiation concerning the 1999 Basel Protocol on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wastes and their Disposal, where private economic interests prevailed over the demands of developing countries concerning a global fund to assist in cleaning waste spills where reparation cannot be obtained from any other entity.[83] Considering the less successful examples of international liability systems in gaining acceptance and functionality, the rationality of spending the limited negotiating resources on developing new liability regimes has in fact been seriously questioned.[84]

Moreover, these mechanisms are retrospective: they are activated only when a damaging incident has already taken place. Especially in cases of major environmental disasters, this can easily lead to solutions that are 'too little, too late'. Even if pure environmental damage were compensated in principle, the compensation would remain an extremely problematic question for various reasons, some beyond the sphere of international space law, not least the challenges related to calculating the value of such damage in monetary terms. The challenges in valuing damage seem to become even more problematic if viewed from the perspective of the insurance industry.[85]

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83 *See* Silva Soares & Vieira Vargas, *supra* note 7, at 103-104.

84 *See*, *e.g.*, Churchill, *supra* note 8, at 32; Brunnée, *supra* note 6, at 351.

85 *Report of the 64th Conference of the ILA 1991*, *supra* note 23, at 178-179.

Even if these issues were resolved, there would be additional challenges in designing the liability system, including questions such as the determination of the relevant damage and appropriate time limits for liability given that the occurrence of damage in outer space may involve (very) long time lags. The difficulties in addressing and evaluating cumulative effects of damage in space would complicate the situation further.

On balance, it would clearly be far more effective to prevent damage altogether, all the more so as there does not exist sufficient technology for eradicating the space debris already generated, for instance. Obviously, 'restitution in kind' is in most cases practically impossible where degradation of outer space is concerned. In particular in cases of creation of considerable amounts of space debris, the only feasible remedy at the moment is financial compensation. The next problematic question would then be to whom such compensation ought to be directed as outer space is a completely international area. One suggestion has been to make compensatory payments to those states which "have a vital interest in the contaminated orbital regions", i.e., states whose existing space activities or those under preparation are hampered by the space debris.[86] However, the identification of such states and the allocation of payments might not be an easy task either.

Hence, a more feasible system could be an international fund that also supports preventive measures. Such a fund could be put in action in a preventive sense at least as concerns harm prevention in cases where a potentially damaging incident has already taken place or where there is a substantial threat of such an incident. An even more advanced preventive mechanism would be one where an international fund is harnessed to provide deterrent support for complying with damage prevention measures, i.e., prior to the actual occurrence of any foreseeable damage. For instance, it has been proposed in the discussions of the UNCOPUOS that "ways and means to provide technical and economic support" should be explored to alleviate the cost impact that compliance with space debris mitigation measures inevitably has on space operations.[87] A fund mechanism applicable for preventive

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86 *See* HACKET, *supra* note 19, at 173-174.

87 *E.g.*, para. 113 of the *Report of the Scientific and Technical Subcommittee of the UNCOPUOS on its 43rd session*, Vienna, Feb. 20 – March 3, 2006, U.N. Doc. A/AC.105/869 (March 16, 2006).

purposes could be one option to create such support. A fund mechanism seems practical also because it could provide a relatively effective anticipatory way to secure the availability of assets when needed.[88] A fund system has been proposed even for the removal of obsolete space objects which obviously would greatly diminish the risk of damaging accidents.[89] The costs of such removal are still quite prohibitive, however.

However, the application of economic mechanisms for controlling space activities might prove infeasible also due to the fact that these activities do not completely fit into the framework of realities and rationality on which economic mechanisms are typically built. For instance, the presumption behind the polluter-pays principle is that the charges related to polluting activities increase in proportion to the seriousness of pollution. Hence it should be in the interest of the polluters to reduce environmental degradation emanating from their activities.[90] This obviously requires that the charges are set at a level adequate for generating such a preventive effect. In the space sector, this level would typically need to be quite high, considering how expensive space activities are in the first place. Given the high risks involved, this could prevent space activities altogether. Economic instruments may even be used for penalizing undesirable behaviour by levying charges which are substantially higher than the costs that the behaviour actually results in. This should further increase the preventive function of such instruments, but for space activities it would easily entail exorbitant costs. On the other hand, despite the extreme expenses involved, economic considerations do not necessarily always play the most prominent role in space mission design and operation; this is most definitely the case where national security interests are at stake.

VIII. CONCLUSION

The amount of space activities is rising steeply. It seems to be only a matter of time when this sector also will, in practice, need a feasible regime

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88 *See* MARK WILLIAMSON, SPACE: THE FRAGILE FRONTIER 270 (2006). For a more detailed discussion concerning fund mechanisms, *see* VIIKARI, *supra* note 20, at 225-230.

89 *Report of the 64th Conference of the ILA 1991*, *supra* note 23, at 176, 178.

90 DE SADELEER, *supra* note 80, at 36.

for the allocation of liabilities. The current liability system established by the U.N. space treaties is quite outdated and will hardly be able to satisfy the space sector for much longer. Although it provides the victim of damage a relatively secure position, liabilities may be allocated somewhat randomly. Economic risks for space actors are excessive. In many cases even securing damages for the victims can be difficult, if not impossible.

This article has proposed a novel approach drawing on international liability systems of similar areas of high-risk activities. Well-designed tiered systems and collective loss-sharing arrangements could prove useful in channelling the risks and ensuring means for adequate compensation in the space sector. The first tier could consist of absolute but limited operator/ owner liability with compulsory insurance. This could be backed up by supplementary state liability and, ultimately, by an international fund. If the source of damage cannot be identified or fault cannot be established, the entire reparation could come from the fund. This would be the case where damage has been caused by unknown space debris, for instance.

Such a system should include clear allocation of the burden of compensation between different stakeholders within a system where the victim of harm can easily identify the entity from which to demand reparation. At best, it could even support preventive measures, instead of providing mere post-disaster compensation.

Although it might not be realistic to expect the space sector to endorse such a progressive approach in the very near future, the experiences from analogous areas of high-risk activities suggest that sooner or later something similar will also be needed for space activities. Otherwise space activities will one day no longer be economically feasible. Solutions adopted for similar situations in other fields of human activity should therefore be thoroughly examined in order to avoid unnecessary failures in regulating space liabilities.