

INTERNATIONAL CONFERENCE ON THE LAW OF OUTER SPACE

“The Role of Law in an Asian Space Age:
Institutions and Applications”

PROCEEDINGS OF THE CONFERENCE

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Dear Reader,

Thank you for your interest in these Proceedings of the 2011 International Conference on the Law of Outer Space, “The Role of Law in an Asian Space Age: Institutions and Applications”, held at Universitas Pelita Harapan, Jakarta (Tangerang), Indonesia.

Space law currently finds itself at a number of critical junctures. The idea of the state as being the sole actor in the space environment no longer holds validity as private, commercial enterprises and public-private partnerships now complement or have taken over activities that were once the exclusive domain of states. Shifts in geopolitical power have also affected space activities, moving from a Cold War world of bipolar, symmetric power to one of polycentric and asymmetric relations, including the rise of a number of Asian states as active space powers.

Given these changes, this Conference, a joint effort of the International Institute of Space Law and the Indonesian Society of International Law, tasked itself with exploring this brave new world, as well as Asia’s increasingly important role in it. Each paper reflects the opinions and insights of its author, selected competitively from a number of abstracts. Each session presents an issue of relevance to contemporary space law in general and to Asia in particular. Taken together, the Conference offers a panorama of the field, while charting a general trajectory of some of the most important issues shaping space law’s course of development.

This event would not have been possible without the support of a number of people and institutions. I thank our author/speakers and moderators from Indonesia and abroad, our sponsors, particularly Berwin Leighton Paisner LLP, Lippo Group and The Jakarta Globe, and also Lembaga Penerbangan dan Antariksa Nasional (LAPAN) and ABNR, as well as Universitas Pelita Harapan for generously agreeing to host this event. I would also thank Pak Jonathan Parapak, Dean Bintan Saragih, Prof. Hikmahanto Juwana, Prof. I.B.R. Supancana, Ms. Tanja Masson-Zwaan, Ibu Susi Susantijo, Ibu Yossi Niken, Mr. John Baker and Mr. John Riady in their personal capacities for facilitating so much of the organizational process. A special mention is also due to Matxalen Sanchez for her diligent copyediting. The list could, of course, go on.

In my personal capacity, I would also like to thank ISIL and each of its volunteers for the hard work and dedication put into making this event a success.

Sincerely,

Jason R. Bonin
Principal Organizer

TABLE OF CONTENTS

TABLE OF CONTENTS	i
GESTURE OF APPRECIATION H. Priyatna Abdurrasyid	iii
PREFACE Tanja Masson-Zwaan	v
 SESSION 1: RULE-BASED GOVERNANCE IN OUTER SPACE – CURRENTS, CONSTRAINTS AND CONTEMPORARY TRANSFORMATIONS	
TRANSFORMING THE STANDARDS OF INTERNATIONAL SPACE LAW INTO NATIONAL SPACE LEGISLATION: INDONESIA’S EXPERIENCE Prof. Dr. I.B.R. Supancana & Mardianis	3
COMMENTS ON DEFECTS IN AND THE PROMOTION OF THE INTERNATIONAL LEGAL SYSTEM GOVERNING THE PROTECTION OF THE SPACE ENVIRONMENT Bin Li	15
MARX ON MARS: FROM <i>RES COMMUNIS</i> TO <i>RES COMMUNIST</i> Virgiliu Pop	23
 SESSION 2: REGIONAL ORGANISATIONS IN ASIA	
ASIA-PACIFIC SPACE COOPERATION ORGANIZATION AS A REGIONAL CENTER FOR SPACE LAW RESEARCH Haifeng Zhao	41
AN ASIAN CENTER FOR SPACE LAW: THE WAY FORWARD FOR PROMOTING AWARENESS OF SPACE LAW IN ASIA Yun Zhao	49
 SESSION 3: SATELLITE APPLICATIONS FOR THE BETTERMENT OF HUMANITY	
LEGAL ISSUES OF COMMERCIAL REMOTE SENSING Mr. K.R. Sridhara Murthi	57

TEN YEARS OF IMPLEMENTATION OF THE INTERNATIONAL CHARTER ON SPACE AND MAJOR DISASTERS: A HISTORY OF SUCCESS?	
Fabio Tronchetti	65
 SESSION 4: SPACE LAW AND TELECOMMUNICATION SATELLITE OPERATIONS	
 COMMERCIAL USE OF OUTER SPACE AND ITS CHALLENGES TO INTERNATIONAL SPACE LAW	
Shouping Li	79
 LAW GOVERNING THE FINANCING OF TELECOMMUNICATION SATELLITES: A REVIEW OF THE CAPE TOWN CONVENTION	
Dr. Sandeepa Bhat B.	95
 INDUSTRY'S POTENTIAL, PLAYER'S SOPHISTRY AND REGULATOR'S OVERSIGHT: PERSPECTIVES ON TELECOMMUNICATION SATELLITE OPERATIONS IN INDIA BY FOREIGN COMPANIES	
Khetan Mukhija	107

GESTURE OF APPRECIATION

by
H. Priyatna Abdurrasyid
(Honorary Director, IISL)

This article attempts to make fully clear problems created by the rise of Space Law as an instrument of national policy by its influence upon the ways and means of expanding national development. The need which this effort may help fill is in itself a product of rapid technological progress in the science of Space Law as well as the breadth of its effects upon the tasks of all States of the world. There are other factors which have conspired against the development of an empirical appreciation of the role of the science of Space Law in the problems of peace and war. The influence of modern technology upon society, for example, has been rather unwelcome until lately in many of the disciplines in the field of Space Law sciences. Therefore, the conducted gathering of IISL in Jakarta lately and the Moot Court conducted content must be very much appreciated in the world efforts for the development and progress of Space Law. But there are issues to be taken care of which are as follows:

- to review the states of art of space science, technology and Space Law in applying the progress of space related activities that can support sustainable development, in particular in Indonesia;
- to identify and delineate cooperation programmers for developing countries, in particular in Indonesia;
- to review systems of education of space science, technology and Space Law with the view of enhancing the process of science and technology dissemination;
- to promote cooperation among scientist in Indonesia and to provide a forum for communication among young scientists in the region.

Guided by the abovementioned goals this presentation will attempt to expose a number of problems which are related to the objectives of these analyses and then to look for the solutions of such problems on the basis of the development of Space Law and without neglecting other aspects of the law. Space utilization has reached such rapid progressing points that at present it is apparent that no State can neglect existing and future Space Law, even though it is becoming inadequate and sometimes difficult to comply with. These situations are due to the rapid development of space science and technology and its application. First of all it is worthwhile to explain that most developing countries are not too conscious about progress in the field of space science, technology and Space Law. Therefore, it is logical that sometimes such developing country is of the opinion, that if it does not sign and ratify the Space Treaty 1967 and its additional agreements, it is completely not bound by the principles laid down in it. Of course, such altitude is not recommended, because a country having such an opinion has often unconsciously neglected, that at least it is morally and internationally under the obligation to observe the existing (and valid) Space Law and its additional agreements, being binding guidelines for all nations, without any exemptions in the framework of any efforts in the exploration and use of outer space. Because lots of the products derived from the exploitation of outer space by developed countries have been fully utilized by developing nations in their day-to-

day living. I am very grateful to the IISL Conference Proceeding Committee for having invited me to write some comment on the success of the Indonesian proceeding 2011 and the conducted Moot Court on Space Law. It is hoped that materials of Space Law will be of interest to not only those concerned with outer space and Space Law, including all those involved directly or indirectly in the ever-growing space industry, but also to all International lawyers, for the birth and growth of International Space Law, which offer a unique insight into the nature and sources of International Law itself.

Jakarta, July 28, 2011

PREFACE

This special issue of the UPH Law Review contains the Proceedings of the 'IISL-ISIL International Conference on the Law of Outer Space - The Role of Law in an Asian Space Age: Institutions & Applications', held from 3-7 June 2011 at Universitas Pelita Harapan, Indonesia.

The conference, held in conjunction with the Asia Pacific Round of the Manfred Lachs Space Law Moot Court Competition, addressed several topical of importance to the Asia Pacific region, such as the role of regional space organizations in Asia, the use of satellite applications for the betterment of mankind, and the legal aspects of satellite communications and commercial uses of space. Presentations were given by a group of renowned experts from Indonesia, India, China, Japan, Hong Kong, Iran, Italy and Romania. Participants included students who had taken part in the moot court competition, and scholars and practitioners from Indonesia and abroad.

Indonesia is an important player in the field of space activities, not in the least through its National Institute of Aeronautics and Space, LAPAN, which was established as early as 1964. It was a great honor that its Head, Mr. Bambang Setiawan Tejasukmana, gave the keynote speech of the conference.

Indonesia ratified four of the five UN space treaties, and is currently on the verge of concluding a multi-year effort at developing national space legislation, joining the relatively small group of states that have translated the obligations under the space treaties into their national legislative system. One of the papers in this volume addresses the Indonesian draft national law in great detail. The well-known Palapa telecommunications satellites are an example for the region. Indonesia was one of the first states to join Intelsat in 1969, and became a member of UNCOPUOS in 1973. These are just a few examples of Indonesia's strong involvement in space activities.

This involvement is also visible in the field of space law, and we were delighted to have many eminent Indonesian scholars with us during the conference. By holding the Manfred Lachs Space Law Moot Court Competition in Indonesia, the number of Indonesian teams has increased considerably, which means that the future of space law scholarship in Indonesia is secured. We hope to see these students back at future IISL events, as future members of our Institute, and as coaches for student teams in future editions of the moot court competition.

Space law is gaining more and more interest in the Asia Pacific region. We see this not only from the large number of universities participating in the moot court competition (the Asia Pacific round has been the round with the largest number of teams for many years), or from the growing number of Asian members in the IISL and its Board of Directors, but also from the plans to set up an Asian Center for Space Law, possibly in the framework of APSCO and based on the model of the European Centre for Space Law, which was created under the auspices of ESA in 1989. You will read more about this in these proceedings.

It is gratifying that the IISL has been able to contribute a small part to this building of Asian space law capacity through the conference. I was pleased to participate personally and to experience the expertise and hospitality of UPH and its staff and students first hand. This was the first event the IISL co-organized in Indonesia, although the Institute has organized several successful conferences in the region, such as in Singapore (2001), Beijing (2004), Bangkok (2006) and Chiangmai (2007).

I am very grateful to UPH, its staff and students, for their hospitality. I would also like to express appreciation to the conference organizers, Jason Bonin and Erline Herrmann, and to all their colleagues on the various committees created for this event, for their excellent support and hard work.

Thanks are also due to our Indonesian members Prof. Doddy Supancana from Universitas Katolik Atma Jaya, and Prof. Hikmahanto, from Universitas Indonesia, for their strong support.

Last but not least, I would like to express a special word of thanks to IISL Honorary Director Prof. Priyatna Abdurrasyid, who has been involved with the Institute since many decades. His support for the Institute and its activities is very precious.

Tanja Masson-Zwaan, IISL President
The Hague, July 2011

**SESSION 1: RULE-BASED GOVERNANCE IN OUTER SPACE – CURRENTS,
CONSTRAINTS AND CONTEMPORARY TRANSFORMATIONS**

TRANSFORMING THE STANDARDS OF INTERNATIONAL SPACE LAW INTO NATIONAL SPACE LEGISLATION: INDONESIA'S EXPERIENCE

Prof. Dr. I.B.R. Supancana & Mardianis[†]

Abstract: To ensure that states comply with their international legal obligations, national institutions must enact national laws that regulate conduct within their territory and by their nationals. Indonesia's Draft National Space Act, which is currently in draft form and awaiting a decision by the President and Parliament, exemplifies efforts to ensure national conduct meets international obligations while balancing the state's own national interests. The article analyzes the process of creating national law and its relationship to international law. It does so in five sections. The first frames the need for international space law, while the second outlines the content of existing space law. The next two sections from the issue of transforming international standards into national legislation, with section three presenting the issues in a general context and section four analyzing the Indonesian experience in light of the general issues. Finally, section five concludes the paper.

I. INTRODUCTION

A. Characteristics of Space Activities and the Need for International Standards of Regulations Governing Space Activities

Since the first human venture into outer space, marking the fourth dimension of human activities, space activities have been dedicated to various military, civil and even commercial purposes. Space activities range from remote sensing, global positioning, broadcasting, communication, construction of space stations, to myriad other forms of scientific research. Some applications of space science and technology include, but are not limited to, global communication systems, navigation, tele-education, development planning, environmental monitoring, weather forecasting, and disaster management.

Space activities have certain inherent characteristics: they are transnational; they use areas beyond the subject of a particular national jurisdiction; they are relatively expensive to conduct; they involve high-technology and dual-use (civil-military) technology; they are extra-hazardous/ultra-hazardous in nature; and they are high risk. Such characteristics require special treatment, in particular when dealing with issues of safety, security, environmental protection, and the protection of the interests of humanity and of potential victims. To deal with the aforementioned issues, it is important to develop international regulatory standards to govern space activities, both conducted by states, organizations, the private sector and even by natural persons acting in their individual capacity.

[·] Faculty of Law, Atma Jaya University, Jakarta, Indonesia

[†] Deputy Director, National Aeronautic and Space Institute (LAPAN), Indonesia

B. The Importance of Adopting Standards of International Space Law into National Space Legislation

The existing space law has been developed through the decades out of a mix of state practices, meeting of minds among space powers, bilateral, regional and multilateral space cooperation agreements, cooperation among members of international organizations (both inter-governmental and non-governmental organizations), practices among private entities, and public-private initiatives.

As an archipelagic state with specific geographical situation, Indonesia has a strong interest in mastering and applying space science and technology to fulfill the needs of its national development. It is a recognized fact that Indonesia has benefitted from human achievements in space science and technology and its applications. In 1976, Indonesia became the first developing country to own and operate a satellite, called “Palapa”, as an element of its domestic communications system.¹ The contribution of the “Palapa” satellite for preserving the unitary state of Indonesia has been very much felt by the country and its citizens. In addition to this contribution, the existence of the national communication infrastructure continues to encourage further economic growth.

To accommodate the national interest relevant to space, there is a requirement to develop the components of the national legal system relevant to space activities by formulating national space legislation, which guarantees that space-related activities are conducted in an orderly manner and that they promote prosperity and the betterment of society. In formulating national space laws and regulations, there must be a balance between national interest on the one hand, and international obligations based on international space law and legal principles on the other hand.

II. STANDARDS OF INTERNATIONAL SPACE LAW

Standards of international space law can be found in the form of hard law, soft law, and from other new developments. This section surveys the relevant sources and standards of international space law.

A. Hard Law

The relevant hard law consists of the following space treaties and other treaties relevant to space activities.

1. The space treaties

Space treaties are the various formal agreements specifically designed and formulated to govern space activities. The main space treaties are:

- (a) 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 the “Space Treaty of 1967”). Known as the “Magna Carta” of space

¹ Since then more satellites have been launched and operated by both State-Owned Enterprises and Private Entities, such as the mobile satellite (MSS) “Garuda”, the broadcasting satellite “Cakrawarta”, the “Telkom” satellite series, and recently a Joint Indonesian (LAPAN) and Technical University of Berlin (TUB) micro-satellite “Lapan-Tubsat”.

law, the Space Treaty of 1967 contains the basic principles for conducting space activities, namely: the freedom of exploration and use of outer space;² that outer space, including the Moon and other Celestial Bodies, remains non-appropriable;³ the applicability of international law to space activities;⁴ that outer space be used for peaceful purposes;⁵ that astronauts shall enjoy the privileges of envoys of mankind;⁶ that particular states remain responsible and internationally liable for the conduct of space activities;⁷ requirements for the registration of space object and its jurisdiction and control;⁸ the preservation and protection of the space environment;⁹ and issues related to international cooperation in outer space.¹⁰

Considering the universal character of the above principles, it is no wonder that more than one hundred countries have ratified the Space Treaty of 1967. Furthermore, in practice even the non-contracting parties to the Space Treaty of 1967 respect and comply with the provisions of the Space Treaty in conducting their space activities. In this context, the Space Treaty of 1967 has become a principal “law-making treaty” instead of merely representing a “treaty contract”;

(b) the *Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space* (hereinafter the “Rescue Agreement of 1968”). The provisions of the Rescue Agreement of 1968 elaborate the provisions contained in article V of the Space Treaty of 1967. These provisions relate to the status of astronaut as envoys of mankind. As the logical consequence of the status of astronaut as envoy of mankind, contracting parties to this agreement are obliged to take all necessary measures and to render assistance to astronauts in case of accident, emergency landing, or distress, and to return the space object itself to the launching state;

(c) the *Convention on International Liability for Damage Caused by Space Objects* (hereinafter the “Liability Convention of 1972”). The Liability Convention of 1972 elaborates upon the principles of international liability as formulated in article VII of the Space Treaty of 1967. The main characteristics of Liability Convention is “victim oriented”, as it is designed to protect the interest of the third party (country), which is not involved in conducting space activities but could nevertheless become “potential victims” of such activities. The essence of this convention is to provide procedures and mechanisms for international liability for damage caused by space objects;

(d) the *Convention on Registration of Objects Launched into Outer Space* (hereinafter the “Registration Convention of 1975”). The Registration Convention of 1968 elaborates upon the provisions of article VIII of the Space

² See, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, done in London, Moscow and Washington, D.C., 27 January 1967, art. I [Outer Space Treaty]*.

³ *Ibid.*, art. II.

⁴ *Ibid.*, art. III.

⁵ *Ibid.*, art. IV.

⁶ *Ibid.*, art. V.

⁷ *Ibid.*, art. VI & VII.

⁸ *Ibid.*, art. VIII.

⁹ *Ibid.*, art. IX.

¹⁰ *Ibid.*, art. XI.

Treaty of 1967. It obliges the the launching state to register an object launched into outer space in an appropriate registry which it shall maintain, and shall inform the Secretary General of the United Nations of the establishment of such a registry. Information to be furnished by the state of registry shall include: the name of the launching state; the appropriate designator of the space object or its registration number; the date and territory or location of launch; the basic orbital parameters including nodal period, apogee and perigee; the general function of the space object; the periodical information concerning the object; and any information regarding inactive satellites;

(e) the *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies* (hereinafter the “Moon Agreement of 1979”). One of the most important provisions in the Moon Agreement of 1979 relates to the establishment of an international regime for exploitation of natural resources on the Moon and other Celestial Bodies as formulated in article XI (5).¹¹ Such international regime, serving as the basis for further exploitation, could in principle be developed through international consent, either multilaterally, bilaterally or regionally. The purposes of such international regime are: to maintain the orderly and safe development of the natural resources of the Moon; to ensure the rational management of those resources; to provide for the expansion of opportunities in the use of those resources; and to ensure an equitable sharing by all states of the benefits derived from those resources.¹²

2. *Other relevant international treaties*

Apart from the existing international space treaties, there are relevant international treaties that must be taken into account in formulating the draft of national space act. These include: the ITU Constitution and Convention and its Amendments, including Administrative Regulations; the Treaty Banning Nuclear Weapons Test on the Surface of the Earth, in the Atmosphere or in Outer Space of 1963; the Treaty on the Non-Proliferation of Nuclear Weapon of 1968. the arrangement among the group of several developed countries regarding “Missile Technology Control Regime”.

B. Soft Law

In addition to the above mentioned space treaties and other international treaties relevant to space activities, some other UNGA Resolutions containing principles governing certain space activities must be taken into consideration when formulating national space legislation, These include, among others, Resolutions pertaining to: Legal Principles Governing Direct Television Broadcasting;¹³ Principles on Remote Sensing from Outer Space;¹⁴ and Principles on Nuclear Power Sources in Outer Space.¹⁵ In addition to these Resolutions, states must also consider the Declaration on

¹¹ *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, done in New York, 18 December 1979, art. XI (5). Article XI(5) states that “State 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”.*

¹² See *ibid.*, art. XI(7).

¹³ UNGA Res. No 37/92 of 1982.

¹⁴ UNGA Res. No 41/65 of 1986.

¹⁵ UNGA Res. No 47/68 of 1992.

International Cooperation in the Exploration and Use of Outer Space for the Benefit of all Countries, especially those of Developing Countries.¹⁶

C. New Developments

New developments in international space law emerge from practices both in the form of national space legislations promulgated by different countries and from a number of commercial practices within the business community. Although different countries have different approaches in developing their national space legislation, some common elements can be found in the provisions of their regulations. These common elements extend to the following issues: the status of outer space; the security issue; the safety of a mission as it is related to a national licensing system; state responsibility and international liability; jurisdictional issues; institutional issues; the preservation and protection of the environment; the protection of intellectual property rights; and the participation of the private sector in space activities.¹⁷

III. HOW TO TRANSFORM STANDARDS OF INTERNATIONAL SPACE LAW INTO NATIONAL SPACE LEGISLATION

In discussing the drafting of the Indonesian draft national space act, we should bear in mind that in an interdependent world, there is a trend toward internationalization of regulation on certain activities. Such trends also apply to space activities. In this regard national space legislation shall fulfill international standards of legislation in order to guarantee its effectiveness both at the national and international level.

A. What Provisions Have Been Standardized?

Regarding standards of international space law to be adopted as considerations for formulating national space legislation, a number of opinions have been expressed. One such opinion is that, in general, such international standards would consist of several principles, such as: the use of international treaties and existing national space legislation as a basis and guidelines; the need to balance between international obligation and national interest; the promotion of international cooperation; the need to maintain flexibility and constant evolvement; and the gradualness of the process, with ordering of priorities.¹⁸ Another is of the opinion that a comprehensive national space legislation need cover the following issues: international legal responsibility for national activities; governmental and private liability; governmental safety requirements for commercial space vehicles; the economic stability of the launch business; compliance with environmental laws; national security considerations; the protection of space investments; the promotion of national space commerce; the

¹⁶ UNGA Res. No 51/122 of 1996.

¹⁷ For further reading on comparative analysis on national space legislations of different countries, see I.B.R. Supancana, *Peranan Hukum dalam Pembangunan Kedirgantaraan [The Role of Law in Aerospace Development]* (Jakarta: Mitra Karya Publisher, 2003) at 19-32.

¹⁸ For further elaboration and analysis of these principles, see Zhao Yun, "National Space Legislation, with Reference to China's Practice" (Paper presented at Space Law Conference 2006, 2-3 August 2006, Bangkok, Thailand) at 8-11.

definition of the boundaries of outer space in order to ascertain the scope of national legislation; and the continuous oversight of commercial space activities after launch.¹⁹

B. *The Problems of Interpretation and Implementation*

1. *The Space Treaty of 1967*

Despite the universal character of the Space Treaty's provisions, there are countries and even experts who have different interpretations of the Space Treaty. For example, some experts disagree as to whether the "province of mankind"²⁰ has the same meaning as "common heritage of mankind".²¹ Although the two terminologies have similarities as it belong to area beyond national jurisdiction, different interpretation may lead to different implementation. Somewhat related to these issues is a concern over the "non-appropriation" principle. On the one hand it has been interpreted as restricting only national (sovereign) ownership, while leaving private ownership open, depending upon national law of each country.²² On the other hand, there has been another opinion that "non-appropriation" shall apply not only to State, but also to other legal entities, including private interests.²³

Another issue relates to the meaning of "peaceful" uses. The formulation of the Space Treaty of 1967 is in line with interpretation made by the US Government which refers to "partial demilitarization" (*i.e.*, as long as such use is not aggressive)²⁴, while other countries (for example, Iran) still question such an interpretation, especially in relation to another interpretation made by the former USSR, which interpreted "peaceful" as "non-military".²⁵

There are still some countries which fail to make a clear distinction between "state responsibility" and "international liability" although legally, a distinction should be made between the two. Responsibility is a legal obligation that should be exercised by one party vis-à-vis another.²⁶ Responsibility is primarily conceived as

¹⁹ See Paul B Larsen, "Is National Legislation on Commercial Space Needed?" (Comments on the Paper of Zhao Yun at Space Law Conference 2006, 2-3 August 2006, Bangkok, Thailand) at 15-19.

²⁰ The word "province" refer to "sphere of works" or "benefit" while the word "mankind" refers to "the society of States". For further analysis see, H A Wassenbergh, *Principles of Outer Space Law in Hindsight* (Martinus Nijhoff Publisher, 1991) at 57.

²¹ For further analysis of the Common Heritage of Mankind (CHM) concept, see Carl Q Christol, *Space Law: Past, Present and Future* (Kluwer Taxation Publisher, 1991) at 382. See also, Bess CM Rijnen, *The United Nations Space Treaties Analyzed* (Edition Frontieres, 1992) at 3-4.

²² The interpretation addressed by one of the US Delegate during UN /Korea Workshop on Space Law, Daejeon, Republic of Korea, 3-6 November 2003.

²³ The interpretation addressed by delegates from Italy, France and the Netherlands during UN/Korea Workshop on Space Law , Daejeon, Republic of Korea, 3-6 November 2003.

²⁴ For further elaboration of the interpretation of "peaceful", see Ivan A Vlasic, "The Legal Aspects of Peaceful and non-Peaceful of Outer Space" in Bhupena Jasani, ed., *Peaceful and Non-Peaceful Uses of Outer Space* (New York: Taylor and Francis, 1991) at 40.

²⁵ Such statement was addressed by the delegate from Iran at the UN/Korea Workshop on Space Law, Daejeon, Republic of Korea, 3-6 November 2003.

²⁶ On etymological analysis regarding the distinction between "responsibility" and "liability", see Nathalie L J T Horbach, *Liability versus Responsibility under International Law* (Ph.D Thesis, Leiden University, 1996) at 21 [*unpublished*] (as quoted by I B R Supancana in *The International Regulatory Regime Governing the Utilization of Erath-Orbits* (Ph.D Thesis, Leyden University, 1998) at 145-146 [*unpublished*]. See also, Bin Cheng, *Studies in International Space Law* (Oxford: Clarendon Press, 1997) at 603.

meaning answerability for the conformity of conduct with norms in general, whether legal, moral or other. It is a much broader notion than liability, which constitutes the legal obligation to make integral reparation for the damage resulting from unlawful conduct.²⁷

Regarding the obligation to conduct “international consultation”, different interpretation still exist, mainly in the event that such consultation is requested by country which potentially would suffer from the impact of space activities conducted by other countries. In case such consultation fail to resolve the disputes, there is no (legal) procedures available to impose obligation to the launching state to stop its activities.

There is also a general lack of clear criterion regarding qualification of which “space crew” can be categorized as “astronauts” and consequently can be regarded as “envoys of mankind”. This ambiguity is extremely important considering the future trends of sending more personnel (including space tourists) to outer space, who it seems should not properly be treated as “envoys of mankind”.

Finally, there is a failure to make clear which country shall be qualified as the “appropriate state”. More specifically, it is unclear whether the term only includes the “launching state”, and “state of registry”, or whether it also includes “the state which issues a license” for conducting space activities.

2. *The Rescue Agreement of 1968*

Ideally, provisions of the Rescue Agreement of 1968 should not raise any problems since it stresses the humanitarian aspects of space activities. Nevertheless, in its implementation some practical problems may arise. For example, with respect to the recent development of space activities which involve personnel such as “payload specialist”, “researcher”, “scientist”, and even “military personnel”, and “space tourist”, the question may arise whether any or all of these personnel can be properly classified as an “astronaut” meriting the status of “envoys of mankind”. Also, there is a question as to whether a contracting party is still under an obligation to render assistance and to rescue an astronaut of other country even if they conduct unfriendly military (reconnaissance) mission against their territory.

Assuming that the obligation applies, there are still issues of compliance. For example, what is the law enforcement mechanism in case of a contracting party refuse to render assistance in accordance with the Rescue Agreement? There is also a question of whether the term “launching authority” applies only to states and inter-governmental organizations or if a private entity can also be considered as a “launching authority”.²⁸

3. *The Liability Convention of 1972*

Based on observations on the provisions of Liability Convention, there are some issues that need to be scrutinized. One such issue relates to the different interpretations given article XXI of the Liability Convention in case the re-entry of a space object causes large scale danger, whether the launching state or the victim state

²⁷ See Bin Cheng, “Space Activities, Responsibility and Liability” (1989) 11 EPIL 299.

²⁸ For further analysis on the problems of interpretation of the Rescue Agreement, see I.B.R. Supancana, *Space Law Development in Retro and Prospect* (Jakarta: Mitra Karya Publisher, 2006) at 61-62.

have the rights to determine or to conduct search and recovery and clean up operations, including its implication to the rights of the victim state to get compensation from the launching state.

Other issues include whether the term recoverable damages was designed and understood to only cover “physical” and “direct” damages. In fact space activities may cause “non-physical”, “indirect”, and even “moral damages”. Finally, as the Liability Convention relies on a government-to-government mechanism for settling claims for compensation, there is no guarantee for a prompt and adequate payment of compensation to the victim. This is ultimately against the victim-oriented character of the Liability Convention itself.²⁹

4. The Registration Convention of 1975

In the process of creating a national registration system for space activities, it should take into consideration the contents as interpreted by contracting parties. Such an interpretation can be described as follows:

- the fact that registration marking is not obligatory under the Registration Convention should raise difficulties in identifying the space object;
- in general, states do not register their space object if it is launched for military missions or classified as a sensitive satellite;
- so far, no law enforcement mechanism exists for the issues of non-compliance with the Registration Convention;
- to prevent double registration, certain countries determine not to register foreign satellites; and
- that, unless its provisions are flexibly interpreted, the continued commercialization and privatization of space activities are not entirely accommodated by the Registration Convention.

IV. THE DRAFTING PROCESS AND CURRENT STATUS OF THE DRAFT NATIONAL SPACE ACT

A. The Drafting Process

1. Indonesia and the ratification of the international space treaties and further implementing legislations

As far as international legal instruments related to space activities are concerned, Indonesia has ratified four of the five space treaties, the exception being the Moon Agreement of 1979.³⁰ By ratifying the above international space treaties, Indonesia has transformed the provisions of those treaties from international legal norms into a part of national law. Consequently, every effort to formulate national space legislation must take into consideration and subject itself to existing international space law. The problem is that in further development of space activities, some states

²⁹ See *Ibid.* at 66-67.

³⁰ The Outer Space Treaty of 1967 was ratified by Law No 16 of 1992; the Rescue Agreement of 1968 was ratified by Presidential Decree No 4 of 1999; the Liability Convention of 1972 was ratified by Presidential Decree No 20 of 1996; while the Registration Convention was ratified by Presidential Decree No 5 of 1997.

tend to make different interpretations of and take different position on some provisions of international space treaties in the process of formulating their national space legislation. In this respect, Indonesia also has its own interpretation of certain terminologies and provisions of the space treaties, to be implemented into its national laws and regulations.

2. Academic draft and initial draft of National Space Act

It was the intention of the drafter that a national space act should not only accommodate national interest and fulfill its international obligations, but shall also anticipate current and future developments in space activities which would affect national interest. Thus, prior to a legislative draft, an academic draft was prepared as the basis for drafting a National Space Act. The academic draft was to provide academic background and justification to the draft of the National Space Act. The first academic draft was finalized by the end of 2003,³¹ and was designed to be comprehensive, taking into consideration both the present and potential future development of space activities that could possibly involve the “national activities” of Indonesia, including formulating rules governing private entities’ participation in space commercialization ventures.

Prior to formulating the academic draft of the National Space Act, officials conducted a comparative analysis of the national space legislation of several space faring nations, such as the United States, Russia, the United Kingdom, France, Sweden, and Australia. The objective of such analysis was to comprehend the different models of national space legislations in order to select a model which fit to the Indonesian situation, and also to draw “common elements” of provisions in different national space legislations to be incorporated into the Draft National Space Act.

In general, the academic draft was a valid basis to be used as the basis in formulating the content of the Draft National Space Act as it ensured the Draft National Space Act satisfied all the relevant parameters and met all international standards.

3. The process of harmonizing with existing national laws and regulations

The process of harmonizing any draft of the National Space Act with other existing relevant national laws and regulations is mandatory under Law No 10 of 2004 on the Formulating of National Laws and Regulations. It is understood that a National Space Act would be a part of the national legal system and therefore it must be formulated in such a way that it is not contrary to or conflict with, but rather is complementary to, existing laws and regulations.

To do this, the drafters needed to harmonize the draft with, among others: Law No 30 of 1999 on Telecommunication; Law No 3 of 2002 on National Defence; Law No 18 of 2002 on National System on Science and Technology; Law No 16 of 2002 on Ratification of the Space Treaty of 1967; Law No 32 of 2002 on Broadcasting; Law No 30 of 1999 on Arbitration and Alternative Dispute Resolution; Law No 1 of

³¹ For more elaboration of the first academic draft of national space act, see I.B.R. Supancana, *Pelebagaan Undang-Undang Keantariksaan Nasional [Institutionalizing National Space Act]* (Jakarta: Mitra Karya Publisher, 2006) at 123-201.

2009 on Aviation; Law No 37 of 1999 on Foreign Relations; Law No 24 of 2000 on International Treaties.

4. *The process of harmonizing with international space laws and principles*

In addition to the process of harmonizing the draft with existing national laws and regulations, the Draft National Space Act must also be harmonized with international space laws and principles and other relevant international instruments, especially those treaties that have been ratified by Indonesia.

B. The Current Status of the Draft National Space Act

1. Main provisions of the Draft National Space Act that reflect the incorporation of standards of international space law

The Draft National Space Act consists of XXV Chapters and its elucidation within the following main provisions: general provisions; principles, objectives and scope; supervision; space management system; space research; mastering of technology; launching of space object; application of technology; space activities for defence and security; international cooperation; safety and security; registration system; licensing system; responsibility and liability; insurance; protection of property rights, including intellectual property rights; environmental protection and preservation; financing and incentives; community participation; disputes settlement mechanism; criminal investigation; sanction; transitional provisions; and concluding provisions.

The above main provisions of the Draft National Space Act have incorporated common elements from the provisions of national legislations as identified by Working Group on National Legislation Relevant to the Peaceful Uses of Outer Space, namely: scope of application; authorization and licensing; continuing supervision of activities of non-governmental entities; registration; liability and insurance; safety; and transfer of ownership or control of space objects in orbit.³²

Some important principles that reflect the incorporation of standards of international space law into the main provisions of the Draft National Space Act can be described as follows:

- Article 2, paragraphs (1) and (2) of the Draft states that Outer Space shall be the province of mankind and exploration and use of outer space shall be in accordance with existing (international) space law. Outer Space shall be free for exploration and use by all states without discrimination of any kind on the basis of equality and in accordance with international law,³³
- Article 3 of the Draft states that the Government of the Republic of Indonesia shall retain jurisdiction and control over objects launched into outer space as long as it is registered by and in the name of Indonesia;³⁴
- Article 7, paragraph (1) of the Draft states that national space activities shall be the responsibility of and managed by the Government of Republic

³² See Draft Report of the Chair of the Working Group on National Legislation Relevant to the Peaceful Exploration and Use of Outer Space (UNGA Doc no A/AC.105/C.2/2010/LEG/L.1, 31 March 2010).

³³ Cf. *Outer Space Treaty*, *supra* note 2, art. I.

³⁴ Cf. *ibid.*, art. VIII.

- of Indonesia, and that such management includes the authorization and supervision of that activity;³⁵
- Article 39, paragraph (2) of the Draft states that LAPAN (National Aeronautic and Space Institute) shall, in case of the accidental or emergency landing of a foreign space object in the territory of Indonesia, conduct a rescue of any astronaut and return any astronaut(s) and space object to the launching State;³⁶ and
 - Article 49, paragraph (7) states that LAPAN shall register any Indonesian space object (and vehicle) with the Secretary General of the United Nations.³⁷

2. *Further processes until enactment*

The current Draft of May 2011 is the latest. The harmonization process has been conducted by an inter-departmental working group, coordinated by The Ministry of Law and Human Rights in accordance with the procedures as stipulated by Presidential Regulation No 68 of 2005. The next process will be to obtain the approval of the relevant ministry for its submission to the President of the Republic of Indonesia. The President then must submit the Draft and its elucidation (including its academic draft) to the Parliament to be discussed within this year's Parliamentary Session. It is expected that by the end of this year the draft will be agreed to and enacted as a law.

V. CONCLUDING REMARKS

Some final conclusions can be drawn from the above elaboration and analysis of the process of transforming standards of international space law into national space legislation based on Indonesia's experience. First, in formulating national space legislation, in this case the Draft National Space Act, Indonesia has taken into consideration standards of international space law by adopting its laws and principles as promulgated both under the space treaties (hard law), relevant UNGA Resolutions (soft law) and new developments based on commonly recognized best practices. Second, in formulating its national space legislation, Indonesia has taken a balanced approach between national interest and its international obligations. Finally, by incorporating the standards of international space law into its national space legislation, it will make an important contribution to facilitating international relations and cooperation in the further development of space science and technology, and in its application to fulfill the needs of national development.

³⁵ *Cf. ibid.*, art. VI.

³⁶ *Cf. Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, done at London, Moscow and Washington, D.C., 22 April 1968, art. II*

³⁷ *Cf. Convention on Registration of Objects Launched into Outer Space, done at New York, 14 January 1975. Art. II, para. 1.*

COMMENTS ON DEFECTS IN AND THE PROMOTION OF THE INTERNATIONAL LEGAL SYSTEM GOVERNING THE PROTECTION OF THE SPACE ENVIRONMENT

Bin LI

Abstract: The protection of the space environment was first established as a principle in the 1967 Outer Space Treaty. This idea has also been specifically enshrined in many provisions of space law treaties. Unfortunately, these provisions cannot effectively solve the problem related to the pollution of the space environment, and space debris in particular. The absence of a systematic legal framework governing the space environment is related to the definition of space debris. Although many technical measures have been taken within some states, a unified legal regime is still necessary.

I. INTRODUCTION: THE PROTECTION OF THE SPACE ENVIRONMENT AS A BASIC PRINCIPLE OF SPACE LAW

The concern over problems with the space environment has been noticed by human beings from an early stage in its exploration of space. In 1958, the 2nd year of the space era, International Council of Scientific Unions (ICSU) established an "Ad Hoc Committee on Contamination by Extraterrestrial Exploration". In March 1959, the Ad Hoc Committee submitted a work report to ICSU. The report affirmed the great significance of carrying on scientific investigation and research in outer space, but also pointed out that space activities might result in the pollution of the space environment, listing biological, chemical and nuclear radiation contamination as probable risks. It also advocated preventing the contamination of those celestial objects through the introduction of extra-earth matter, and confessed that space objects may cause some damage. Although the report did not specifically discuss the issue of space debris, it pointed out that in order to prevent the production of debris from the collision of satellites, there should be a set of rules in outer space which are similar to traffic rules on earth.¹ This report has great effects on United Nations Committee on the Peaceful Uses of Outer Space (COPUOS). The two reported mentioned above are some experts' opinions in essence. They manifest at an early stage that, we were already aware of the issue of the need to protect the space environment, which includes the problem of debris produced by the collision of satellites and indicate that there should be some rules to settle the problems of environmental pollution.

Since 1965, space lawyers have made clear that space debris may have the potential to cause danger to the space environment.² In 1967, COPUOS drafted the *Treaty on Principles Governing the Activities of States in the Exploration and Use of*

· Dr. Bin Li, Associate Professor, Associate Director of Beihang University Institute of Space Law, Assistant Dean of Beihang University School of Law. This article only reflects the author's views.

¹ Carl Christol, *The Modern International Law of Outer Space* (Oxford: Pergamon Press, 1982) at 132-133.

² He Qizhi, *The Outer Space Law* (Beijing: Law Press, 1991) at 200.

Outer Space, including the Moon and Other Celestial Bodies (Outer Space Treaty),³ which opened for accession and came into effect in October the same year. According to the latest data, there are 98 state ratifications and 27 states signatories to the Treaty. It can be assumed that this is the most influential and recognized one among all the treaties of space law. Article IX of the Outer Space Treaty provides that in the exploration and use of outer space, including the Moon and other celestial bodies, states parties shall be guided by the principle of cooperation and mutual assistance, shall conduct all their activities with due regard to the corresponding interests of all other states parties, shall act so as to avoid either harmful contamination or adverse changes in the Earth's environment resulting from the introduction of extraterrestrial matter and, where necessary, shall adopt appropriate measures for this purpose.⁴ According to Article IX, if a state party has reason to believe that an activity or experiment planned by it or its nationals in outer space or on a celestial body would cause potentially harmful interference with activities of other states parties in the peaceful exploration and use of the space environment, it shall undertake appropriate international consultations before proceeding with any such activity or experiment.⁵ Similarly, a state party which has reason to believe that an activity or experiment planned by another state party in outer space or a celestial body would cause potentially harmful interference with others its activities, it may request consultation concerning the activity or experiment.⁶

Article IX clearly deals with environmental pollution caused by space activities. The first sentence of this article clearly sets out the principle that in the exploration of outer space, each state should not only protect the Moon and other celestial bodies from pollution, but also guarantee that the Earth's environment is free from the negative effects of its space activities. Within the domain, the former is defined as "Forward Contamination", while the latter is "Back Contamination". But if there is no preexisting life in outer space, it is impossible for "Back Contamination".⁷ The type of contamination of concern here is mainly "Outward Contamination".

Article IX also sets out the parameters of a consultation system. However, Article 9 possesses at least two defects. First, if a State Party realizes that its activities in outer space would cause interference in the peaceful exploration and use of outer space, then it shall undertake appropriate international consultations. There is no indication of what "appropriate" may mean. Meanwhile, since the consultations are "international" and one of the basic principles of space law is the principle of common human interests, it is arguable that "international" should include at least all parties to the convention. This would make for a very complex consultation process, a process for which Article IX does not provide. Second, if a party has reason to believe that an activity planned by another party in outer space would cause interference in the peaceful exploration and use of outer space, then the former may only request consultations concerning the activity. The state party which planned the activities can choose to either accept or ignore the request, and does not have to accept an outcome.

³ *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, done in London, Moscow and Washington, D.C., 27 January 1967* [*Outer Space Treaty*].

⁴ *Ibid.*, art. 9

⁵ *Ibid.*

⁶ *Ibid.*

⁷ Glenn Reynolds & Robert Merges, *Out Space: Problems of Law and Policy* (Boulder: Westview Press, 1998) at 206.

It is obvious that the defects of the consultation system could not solve the problems threatening the peaceful use of outer space for good and for all, such as the problem of environmental pollution. But there is no doubt that Article IX establishes an important principle in space law: that is, the principle of the protection of space environment.

II. THE CONCEPT OF SPACE DEBRIS AND REGULATIONS GOVERNING IT

“Space debris” or “orbital debris” is a familiar term in space law. While people commonly perceive space debris as space junk, so far nobody has yet to reach an agreement about the exact definition, whether in science or law. The most influential definition of space debris so far appeared in the *Technical Report on Space Debris*, issued by the Scientific and Technical Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space (STSC) in 1999.⁸ In this report it proposed a definition of the term that it modified at its subsequent sessions to read as follows:

Space debris are all manmade objects, including their fragments and parts, whether their owners can be identified or not, in Earth orbit or re-entering the dense layers of the atmosphere that are non-functional with no reasonable expectation of their being able to assume or resume their intended functions or any other functions for which they are or can be authorized.⁹

However, the Report also pointed out that so far there is still no consensus as to a definition of the term.

Since it is difficult to define space debris, opinions on the sources of space debris as well as its composition vary within the international community at present. Nevertheless, generally speaking, the main sources of space debris include: (a) space debris directly from satellites and last stage of launch vehicles after completing their missions; (b) the remaining rocket fuel, the remaining gas in a satellite’s high pressure cylinders and unused batteries, all of which may explode and produce innumerable space debris; (c) when the nuclear-powered satellites which use liquefied metal Na-K as refrigerants become invalid, small droplets of the escaping refrigerants would produce small debris; (d) aluminum particles will be produced when the aluminum powder added in the solid rocket fuel will produce is burned.¹⁰

The issue of space debris is a new problem which appeared after entering into the space era. It is increasingly being recognized that the damage on satellites and other space objects caused by space debris is the biggest threat to space activities. The problems brought by space activities were and will be met in China's space activities. Once a specialist revealed that only when China launched its first lunar probe

⁸ Scientific and Technical Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space, *Technical Report on Space Debris* (Un Doc. A/AC.105/720), online: <http://www.oosa.unvienna.org/pdf/reports/ac105/AC105_720E.pdf>.

⁹ *Report of the Legal Subcommittee on the work of its Thirty-second Session (22 March - 8 April 1993)*, UNCOPOUSOR, UN Doc. A/AC.105/544 (1993) (cited in “Technical Report on Space Debris”, *ibid.* at 2, para. 6).

¹⁰ Space Debris, “Space Threat Made by Mankind Themselves” (2011), online: <<http://www.jrb.com/nl/jrb846/ca433880.htm>>.

Chang'E-1 did it realize the realness of the problem of avoiding space debris.¹¹

Having realized the potential threat brought about by space debris, the space powers are currently undertaking measures to settle this issue. At present the measure is mainly technical. The American government set the *United States Government Orbital Debris Mitigation Standard Practices* to provide some technical guidance to lessen the production of space debris in American space activities.¹² The Bush Government authorized a new U.S. national space policy on August 31, 2006, with part 11 establishing guidance material with respect to the problem of space debris.¹³ The policy notes that the United States shall seek to minimize the creation of orbital debris by government and non-government operations in space in order to preserve the space environment for future generations. In order to achieve the goals of this policy, the Bush administration proposed to utilize three technical measures to mitigate space debris: (a) departments and agencies shall continue to follow the United States Government Orbital Debris Mitigation Standard Practices, consistent with mission requirements and cost effectiveness, in the procurement and operation of spacecraft, launch services, and the operation of tests and experiments in space; (b) the Secretaries of Commerce and Transportation, in coordination with the Chairman of the Federal Communications Commission, shall continue to address orbital debris issues through their respective licensing procedures; and (c) the United States shall take a leadership role in international fora to encourage foreign nations and international organizations to adopt policies and practices aimed at debris minimization and shall cooperate in the exchange of information on debris research and the identification of improved debris mitigation practices.¹⁴

The facts show that space powers have already begun to increasingly emphasize the issue of space debris and are taking efforts to settle this global issue, and that those efforts are mainly in relation to technical measures. By contrast, the legal regulations on the space environmental pollution caused by space debris are lagging far behind. From legal perspective, is there a systematic legal regulatory framework with respect to this issue in international law, and especially in space law?

III. THE DEFECTS IN CURRENT THE CURRENT INTERNATIONAL LEGAL SYSTEM GOVERNING SPACE DEBRIS POLLUTION

At present, the biggest threat in space activities comes from space debris, causing damage to operating satellites and spacecraft. As mentioned above, the 1967 Outer Space Treaty only set some principled regulations with respect to the protection of the space environment. But how to adopt complete and direct measures to provide effective protection toward space environmental pollution in space activities remains a problem to be solved by concluding a specific convention. In other words, more

¹¹ Du Heng, "Chang'e-1 Will Avoid Space Junk", online: <http://news.qq.com/a/20071017/002283_1.htm>

¹² National Oceanic and Atmospheric Administration, "United States Government Orbital Debris Mitigation Standard Practices", online: http://www.nesdis.noaa.gov/CRSRA/files/USG_Orbital%20Debris_Standard_Practices.pdf

¹³ Office of Science and Technology Policy, Executive Office of the President, "U.S. National Space Policy" (31 August 2006), online: <<http://www.whitehouse.gov/sites/default/files/microsites/ostp/national-space-policy-2006.pdf>>.

¹⁴ CNSA, "All Nations Watch the New Trend of America National Space Policy", online: <<http://www.cnsa.gov.cn/n615708/n620172/n677078/n751578/88085.html>>.

specific and pointed agreement should be reached to solve the problem of major polluters, including space debris, in the protective system of the space environment. But in fact, there is no international convention or agreement to specifically deal with such an issue so far. Only some articles concerning the protection of the space environment can be found in some treaties, but none set clear regulations on environmental pollution caused by non-space debris polluter or make general or comprehensive rules on protection of space environment.

A. *The Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water*

The *Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water* came into effect in 1963.¹⁵ In theory, nuclear tests can be done in atmosphere, outer space, underwater and underground. For this treaty did not ban nations from making nuclear test underground, it is also called as *Partial Nuclear Test Ban Treaty*. There are five articles in this treaty. Specifically, Article 1 provides that each of the Parties to the Treaty undertakes to prohibit, prevent and not carry out any nuclear weapon test at any place under its jurisdiction or control including outer space and under water.¹⁶ It is obvious that this article eradicates space environmental pollution caused by nuclear radiation to a large extent by banning nuclear tests in the atmosphere and in outer space. For this reason, it is helpful to protect the space environment, despite the target of this article being nuclear radiation pollution.

B. *The Moon Agreement*

The *Moon Agreement* also contains some articles on the general regulations on the protection of space environment.¹⁷ Apart from Article IX of the *Outer Space Treaty*, 7 of the *Moon Agreement* provides a set of clear requirements for protecting the space environment. Article 7 (1) provides that in exploring and using the Moon, state parties shall take measures to prevent the disruption of the existing balance of its environment, whether by introducing adverse changes in that environment, by its harmful contamination through the introduction of extra-environmental matter or otherwise, and that state parties shall also work to avoid harmfully affecting the Earth's environment, either by introducing extraterrestrial matter or through other action.¹⁸ Analysis shows that although this Article prescribes some rules for the protection of the lunar and Earth environment, there exist a number of ambiguities in term like "adverse changes", "extra-environmental matter", "harmful contamination" and "harmfully affect". Also, while the treaty offers protection of lunar and Earth environment, there is no specific regulations on the environmental pollution caused by space debris. Thus, whether this agreement can be applied to space debris is still in debate.¹⁹ Moreover, the actual value of the Article is severely reduced by the small

¹⁵ *Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water*, done in Moscow, 5 August 1963 (entered into force 10 October 1963).

¹⁶ *Ibid.* art. 1.

¹⁷ *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*, done in New York, 18 December 1979.

¹⁸ *Ibid.*, art. 7(1).

¹⁹ Yin Yuhai & Zhang Yanhong, *Pollution of Space Environment and Coordination or Related International Laws (A)*

number of signatories to the Agreement.

C. *The Liability Convention*

The *Liability Convention* also has some provisions dealing with the protection of the space environment.²⁰ The difference between this Convention and the first two documents is that the latter aims at preventing space environmental pollution before it happens, while the former tries to remedy the problem by compensating the victim after the pollution has happened. The basis of concluding this convention is Articles VI and VII of the *Outer Space Treaty*. Article VI establishes the principle of state responsibility in space law, that is, State Parties to the Treaty shall bear international responsibility of 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.²¹ Meanwhile, Article VII establishes the principle of compensatory liability, that is, each State Party to the Treaty that launches or procures the launching of an object into outer space, and each State Party from whose territory or facility an object is launched, is internationally liable for damage to another State Party to the Treaty or to its natural or juridical persons by such object or its component parts on the Earth, in air space or in outer space.²² Accordingly, the *Liability Convention* expanded those two principles in its Articles 2 and 3. Article 2 provides that a launching State shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the earth or to aircraft in flight, while Article 3 states that in the event of damage being 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, the latter shall be liable only if the damage is due to its fault or the fault of persons for whom it is responsible.²³ There are two problems to be solved if the related provisions in the *Liability Convention* were to be applied to space debris. First, the term "damage" mentioned in the Convention requires it be caused by "space objects", then are "space objects" and "space debris" the same concept, or does "space object" include "space debris"? Second, does the "damage" in the *Liability Convention* involve the damage to the environment?

The first one has been a very controversial issue because there is no clear definition of either "space object" or "space debris" in space law. In the *Liability Convention*, "space object includes component parts of a space object as well as its launch vehicle and parts thereof".²⁴ But this cannot be assumed as a strict legal definition since the connotation of "space object" is not affirmed.²⁵ For instance, the view was expressed that a space object is any object which is launched into outer space or operating in outer space independently, it may carry aircraft with instruments or facilities that are going to release into orbit round the earth. And any of those instruments or facilities becomes an operating satellite when it is put into orbit. And also the space probe floating toward the faraway planet. Pursuant to this

²⁰ *Convention on International Liability for Damage Caused by Space Objects, done in London, Moscow and Washington, D.C., 29 March 1972.*

²¹ *Ibid.* art. VI.

²² *Ibid.*, art. VII.

²³ *Ibid.*, arts. II-III.

²⁴ *Ibid.*, art. I(d).

²⁵ He Qizhi & Huang Hui Kang, *The Outer Space Law* (Qingdao: Qingdao Press, 2000) at 96.

definition, any object operating in the outer space is a space object, and it definitely includes space debris. But the opposite opinions held that there are differences between "space object" and "space debris", among which the most important is the former is "functional". "Functional" means that it can perform the designated task and missions. And the latter is "non-functional", that is there is no legitimate expectation that it keeps its original function and performs its task. Therefore, the relation between "space object " and "space debris" is not solved properly.

The answer to the second question is relatively clear. The result of 1978 Cosmos 954 incident between Soviet Union and Canada affirmed that the "damage" in the *Liability Convention* included the damage to the environment. But on the basis of the analyses presented above, one basic precondition, the definition of "space debris", is not satisfied when resolving the problem of whether the convention is applied to environmental pollution caused by space debris. Therefore, whether the protective measures of environment involve space debris pollution is still an ambiguous issue.

D. *Treaty on the Limitation of Anti-Ballistic Missile Systems*

On May 26, 1972, Soviet Union leader Brezhnev and the American President Nixon signed the *Treaty on the Limitation of Anti-Ballistic Missile Systems* in Moscow.²⁶ There are only 16 articles in this treaty, but because many international conventions concerning disarmament and nuclear non-proliferation have connections with this treaty, it is considered as a foundation of global strategic stability. Article 5 provides that each Party undertakes not to develop, test, or deploy ABM systems or components which are sea-based, air-based, space-based, or mobile land-based.²⁷ This Article is an express provision concerning the obligation of mutual disarmament. But if the two Parties develop, test, or deploy ABM systems which are space-based, this kind of space activity would not only lead to the rapid development of space militarization, but also definitely produce masses of missile debris in the test process. Therefore, the Article provides for the protection of space environment from a practical point of view, and even the problem of the mitigation of space debris. But on December 12, 2001 the American President Bush denounced the *Anti-Ballistic Missile Systems Treaty* at the White House. It is indeed a big shock to the efforts for international disarmament; meanwhile it also brought negative effect to the protection of space environment.

Through the analyses of some related international treaties, the conclusion can be reached that at present there are some framework and general regulations on the protection of space environment in space law. But several defects exist within these regulations, including a lack of definition and ambiguities in terms. And the deficiencies surely add to the lack of maneuverability and an absence in real legal meaning. Indeed, at this point there is no effective international treaty with respect to the control of the environmental pollution caused by space debris. Again, the reasons for this are twofold: first, the definition of space debris is not clear in law, and second, there is no specific treaty of protection of space environment in space law that can be used as a basis or reference.

²⁶ *Treaty between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Anti-Ballistic Missile Systems, done at Moscow, 26 May 1972* (entered into force 3 October 1972).

²⁷ *Ibid.* art. V.

IV. THE PROMOTION OF THE INTERNATIONAL LEGAL SYSTEM GOVERNING THE PROTECTION OF THE SPACE ENVIRONMENT

As mentioned above, as a major source of pollution in the space environment, space debris make an increasing threat to the sustainability of mankind's space activities. And at present there is a lack of a set of effective international legal rules with respect to such issues, a point which is particularly very important. The author believes that this can be settled through the following initiatives.

First, in the long term, taking the increasing threat caused by space debris and the efforts made at the technical level into considerations, there are several possibilities to conclude a treaty concerning space environmental pollution caused by space debris. This, however, is a slow process. From a short term point of view, each nation can inspect and promote the regulation of the existing environmental protection laws within space law, especially by specifying some important concepts, like "space object" and "space debris", as well as their intentions and denotations. This task is the foundation for later protections, and can clear the hurdle of definition when finally set in a unified international treaty.

Secondly, on the basis of the work above, organizations should encourage the international community to draft and pass a specific treaty concerning the protection of the space environment through other guidance measures. The work should provide guidance for the work of each nation and the international community similar to *Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting*. In fact, for it is difficult to make a unified and comprehensive treaty, a resolution adopted by the General Assembly can be used as the foundation to conclude such a treaty later.

Finally, although the paper refers to the international legal systems governing space debris, international laws and domestic laws influence and interact on each other. Therefore, when establishing international legal systems, it must take the related domestic legal system and mechanisms of other representative powers into consideration. As for China, space lawyers are taking great efforts on this and some government departments and academic institutions are making related research on domestic laws governing space debris. All parties concerned should continue to provide this work with their full support. If well-prepared, in the future China will play an important and even a leading role in the process of concluding such an international treaty. And this will also better defend China's international interests and space rights.

MARX ON MARS: FROM *RES COMMUNIS* TO *RES COMMUNIST*

Virgiliu Pop

Abstract: There is perhaps no other provision within the *corpus juris spatialis* so polemical as the Moon Agreement's encapsulation of the Common Heritage of Mankind principle. This paper reviews the history of the Common Heritage of Mankind (CHM) as it applies to outer space, comparing it with the concepts of *res communis*, capitalist systems, and the Soviet communist system. Indeed, like communism, CHM arose out of a perceived polarization between the "haves" and the "have-nots" of international society. This comparison leads to a comparative study between CHM and the communist national systems of law before analyzing the arguments for and against CHM. Ultimately, this paper finds that the CHM goes beyond the communist ideals of the Eastern Bloc, to the detriment of the global "have-nots". Indeed, as newly emergent space-faring nations such as India, China and Brazil clearly demonstrate, developing countries can develop, hone and perfect their own systems through without a system of CHM-like entitlements.

"From each according to his abilities, to each according to his needs"

- Karl Marx, *The Criticism of the Gotha Program*

I. INTRODUCTION

In the year 1905, the young Bolshevik Leonid Lenni embarks on a rocket to Mars and, upon landing thereon, learns that the "Red Star" is a prosperous socialist state, whereby capitalists have been peacefully retired following the building of the canal system. Or so claims Alexander Bogdanov's 1908 homonymous utopia, "Krasnaya Zvezda".¹ In 1923, a Soviet engineer, Mstislav Los, imagined by Alexei Tolstoy, travels to the same planet to find a totally different situation: the Martian workers have been confined to underground corridors, the gap between them and the ruling class is vast, and the planet is dying due to a deteriorating environment.² Half a century later, Soviet and American space probes survey the Red Planet and find it apparently devoid of life. At the beginning of 2011, on the occasion of the World Water Day, Hugo Chavez, the Socialist president of Venezuela, offered his two cents on this matter:

I have always said, heard, that it would not be strange that there had been civilization on Mars, but maybe capitalism arrived there, imperialism arrived and finished off the planet ...Careful! Here on planet Earth where hundreds of years ago or less there were great forests, now there are deserts. Where there were rivers, there are deserts.³

· Reseacher, Romanian Space Agency, virgiliu.pop@gmail.com. This paper represents an updated version of the chapter "The Common Heritage of Mankind: Reaping Without Sowing" of the volume "Who Owns the Moon? Extraterrestrial Aspects of Land and Mineral Resources Ownership", Springer, 2008.

¹ A. Bogdanov, *Krasnaya Zvezda* (Sankt Petersburg: Tovarishestvo Hudoznikov Peshaty, 1908).

² A.N. Tolstoy, *Aelita* (Moscow: Foreign Languages Publishing House, 1950).

³ E. China, "Chavez Says Capitalism May Have Ended Life on Mars" *Reuters* (22 March 2011), online: <http://www.reuters.com/article/2011/03/22/us-venezuela-chavez-mars-idUSTRE72L61D20110322>.

Could capitalism be really guilty for transforming the extraterrestrial realms into “a vast, lonely, forbidding type of existence or expanse of nothing” or a “magnificent desolation” – as the Apollo astronauts portrayed the Moon⁴ and would certainly describe Mars? Could communism restore them to their former glory? This paper ponders the above question from a legal and ideological perspective.

II. *RES COMMUNIS*, OR *RES COMMUNIST*?

Article I of the Outer Space Treaty proclaims that the extraterrestrial realms – outer space, including the Moon and other celestial bodies – shall be “free for exploration and use by all States without discrimination of any kind, on a basis of equality”, and that “there shall be free access to all areas of celestial bodies”. The exploration and use of the extraterrestrial realms is declared as being the “province of all mankind”. This norm effectively establishes among the States Parties an open access and free use regime on Mars, making it a public good whose owner is everybody and nobody. Several other tenets of the Outer Space Treaty confirm and elaborate the above regime.

There is practically a consensus among scholars that the “province of all mankind” concept valid for the extraterrestrial realms draws upon the Roman property notion of *res communis* – *i.e.*, “that States have rights of free access and use - but not rights of ownership - to the shared property of the community” – the same being the basis for the freedom of the high seas.⁵

While private appropriation of the extraterrestrial realms may not exist on its fullness under a *res communis* regime, some of its elements are permitted. Property is an embodiment of three attributes - *jus utendi* (the right to use), *jus fruendi* (the right to enjoy the fruits) and *jus abutendi* (the right to “abuse” one’s own good). *Res communis* is built around *jus utendi* yet forbids *jus abutendi*. As to *jus fruendi* – *i.e.*, to collect the “fruits” of the extraterrestrial realms, under the *res communis* regime the conversion of immovables into movables by way of extraction is allowed in the light of the non-appropriation principle, a distinction being made between the appropriation of outer space and celestial bodies and the appropriation of materials thereon. While lacking *fee simple* ownership over the land thereof, private actors are, under the Outer Space Treaty regime, entitled to explore and exploit the natural resources of Mars. Ownership of extraterrestrial products vests in those who sponsor their removal, through the labor invested in seizing them.

The *status quo* of the commons regime is not very stable, being challenged on two fronts. On the right, the champions of space property rights challenge the lack of transferability and marketability of *res communis*; they would like to instate the *jus abutendi*, the “right to abuse” property – that is, to have a full dominion over it. On the left, the champions of the common heritage of humankind would like to lessen the *jus fruendi* and share the extracted resources with entities who did not participate in their extraction.

This latter spectre haunting outer space - the spectre of communism - haunted, and still haunts, our home planet. “In the earlier epochs of history” – wrote Marx and Engels – “we find almost everywhere a complicated arrangement of society into various orders ... In ancient Rome we have patricians, knights, plebeians, slaves; in the Middle Ages, feudal

⁴ A. Chaikin, *A Man on the Moon*. (London: Penguin, 1994) at 121 & 211.

⁵ B.M. Hoffstadt, “Moving the heavens: lunar mining and the “Common Heritage of Mankind” in the Moon Treaty” (1994) 42 *UCLA L. Rev.* 575, at 567.

lords, vassals, guild-masters, journeymen, apprentices, serfs”.⁶ And in the space age, we have the antagonistic spacefaring and non-spacefaring nations, developed and developing states, the “North” and the “South”.

The post-Sputnik and post-colonial era could not escape the materialist conception of history, whereas the world and its extraterrestrial surroundings are the scene of the class struggle between the haves and have-nots. Marx, Engels and many other communists sought an end to capitalism and the establishment of an egalitarian society. The 20th century saw the establishment of several Communist States, and the adoption of several Socialist principles into the mainstream. In the 1970s, the Marxist ideas received escape velocity through the work of the United Nations, who oversaw the drafting of the “Agreement Governing the Activities of States on the Moon and Other Celestial Bodies”. The Moon Agreement is directly relevant to Mars as well; according to Article 1.1., its provisions relating to the moon shall also apply to other extraterrestrial celestial bodies within the solar system, pending the establishment of specific legal norms for the other celestial bodies. We will thus take the liberty to replace “the moon” with “Mars” when quoting the legal text.

Of special importance are the provisions of its Article 11.1 stating that “[Mars] and its natural resources are the common heritage of mankind”, of Article 11.5 whereby States Parties agree to create “an international regime, including appropriate procedures, to govern the exploitation of the natural resources of [Mars]”, and of Article 11.7.d, where one of the main purposes of the above regime is revealed as being:

An 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 [Mars], shall be given special consideration.

Whereas at the beginning of the Space Age the Soviet technological superiority sparked fears in the United States that “space would soon be *res communist*, not *res communis*”⁷, two decades later the Moon Agreement effectively planted the Communist standard in the Martian soil.

III. THE GENESIS OF THE COMMON HERITAGE OF MANKIND CONCEPT

The Common Heritage of Mankind (CHM) concept has been presented, in most of the literature, as having originated in the 1967 proposal of the Maltese Ambassador to the UN, Arvid Pardo, that the sea-bed and ocean floor beyond national jurisdiction should be declared the Common Heritage of the Mankind by the United Nations General Assembly⁸. This is not wholly accurate, as both similar ideas and similar language have been used before.

During the Moon Agreement negotiations in the Legal Subcommittee of the

⁶ K. Marx & F. Engels, *Manifesto of the Communist Party* (1848), para. 1.

⁷ W.A. McDougall, *The Heavens and the Earth – A Political History of the Space Age* (New York: Basic Books, 1985) at 202.

⁸ E.W. Paxson, “Sharing the Benefits of Outer Space Exploration: Space Law and Economic Development” (1993) 14 *Michigan J. of Int’l L.* 487 at 501.

UNCOPUOS, some national delegates were not pleased with the diplomatic term chosen, asking off-the-record “[w]ho died and left the moon to mankind?”⁹ The same question was asked by R. V. Dekanozov:

[I]f celestial bodies and their resources are common inheritance, and succession in civil law is transfer of the property of a decedent (testator) to his successor (heirs), who then should be considered as the testator and has he existed at all?¹⁰

The heritage in question is not the result of a death, yet it stems from a testament - namely the Old Testament, where God blessed the first humans to “fill the earth and subdue it” (Gen 1:28, NIV). This tenet was seen by Pope Pius XII as referring not only to our planet, but to “the whole of creation which He offered for the human spirit to penetrate”.¹¹

The term itself has been used verbatim as early as the 1840’s – 1850’s; US Senator William Henry Seward delivered a speech in 1850 where he described the newly acquired public domain as “part of the common heritage of mankind, bestowed upon them by the Creator of the universe”, and called for its enjoyment “either in common or by partition”.¹² The idea of a possible partition of the divine bequest is not new to Seward; in the 17th Century, John Locke suggested that “God gave the world to men in common; but ... it cannot be supposed he meant it should always remain common”.¹³ Communist editor Hermann Kriege endorsed the promoters of the American land reform, who “call the soil the communal heritage of all mankind” and want “to preserve as the inalienable communal property of all mankind the 1,400 million acres of land which have not yet fallen into the hands of rapacious speculators”. For this reason, he shared in the goal “to place 160 acres of American soil at the command of every farmer, from whatever country he may hail, so that he may feed himself”, a plot “which they needed only to settle and make fruitful with the labour of their hands”.¹⁴

While “heritage” is the word chosen to figure in the English text of the Moon Agreement, the Spanish text contains the term “patrimonio” and the French one refers to “patrimoine”; together with the Arabic, Chinese and Russian texts, these are equally authentic, according to Article 21 of the Moon Agreement. On an international level, calls for the international community to regard as “common patrimony” those “things which cannot be held by one nation without detriment to the others” were put forward, as early as the 1830’s, by Latin American jurist Andrés Bello. In 1898, French lawyer Albert Geouffre de Lapradelle argued that the oceans should be considered “the patrimony of humankind”, a concept shared six decades later by Prince Wan Waithayakon of Thailand, the President

⁹ C.D. Thomas, “The Moon Treaty: Should the United States become a Party?” (1980) 74 *Proceedings of the Am. Soc’y of Int’l L.* 152 at 159.

¹⁰ R.V. Dekanozov, “Juridical Nature of Outer Space, including the Moon and other Celestial Bodies” in *Proceedings of the 17th Colloquium on the Law of Outer Space* (1974) 200 at 202.

¹¹ B. Cheng, “International law and high altitude flights: balloons, rockets and man-made satellites. (1957) 6 *Int’l & Comp. L. Q.* 487 at 505

¹² W.H. Seward, “*The “Higher Law” Speech* (11 March 1850), paras. 22-23, online: <<http://facweb.furman.edu/~benson/docs/seward.htm>>.

¹³ J Locke, *The Second Treatise of Civil Government*. (1690), s. 34.

¹⁴ (Quoted by K. Marx & F. Engels, *Circular against Kriege* (1946)).

of the first Law of the Seas Conference.¹⁵ In 1949, R.A. Smith wrote that “the Moon is not the property of any state; if it is untenanted, it is the common heritage of mankind”, whereas Lionel Laming and Oscar Schachter declared, roundabout the same time, that not only the Earth, but all the solar system deserves to be considered as the heritage of mankind.¹⁶ Not much later, in a 1953 article, Joseph Kroell stated that “L’espace extra-terrestre ... forme le patrimoine commun de l’Humanité”.¹⁷ In July 1966, President Johnson called upon the United States to ensure that “the deep seas and ocean bottoms are, and remain, the legacy of all human beings”.¹⁸ Five months later, the UN General Assembly adopted the Outer Space Treaty, whose Article I provides that “[t]he exploration and use of ... the ... celestial bodies ... shall be the province of all mankind”. A resolution of the World Peace through Law conference adopted in early summer 1967 declared the seas beyond the continental shelf to be “the province of the UN”,¹⁹ whereas in June of the same year, the Argentine scholar Aldo Armando Cocca introduced the CHM concept in the discussions being held in the Legal Subcommittee of the UNCOPUOS.²⁰ Markus G. Schmidt deems that, while many of the proposals above were “vague and without backing”, Arvid Pardo’s plan was “both timely and well conceived”.²¹

As suggested by Gennady M. Danilenko the CHM concept needs to be assessed within the broader context of the developing world’s efforts at that time to radically change the existing system of international economic relations.²² Indeed, the end of the 1960’s saw a paradigm shift within the United Nations, with an increasing empowering of the developing countries; an important step would be taken in 1974, with the adoption by the UN General Assembly of Resolution 3201 titled “Declaration on the Establishment of a New International Economic Order”. Elevating the concept of class struggle into outer space, this particular document outlined the widening gap between the developed and developing world, noted that “[t]he benefits of technological progress are not shared equitably by all members of the international community”, and proclaimed the need for the establishment of a “new international economic order based on equity ... interdependence, common interest and cooperation among all States ... which shall correct inequalities”. In 1976, the Club of Rome released a report titled “Reshaping the International Order”, where outer space was seen as “a geographical entity forming a ‘common heritage of mankind’”

¹⁵ M.G. Schmidt, *Common Heritage or Common Burden? The United States Position on the Development of a Regime for Deep Sea-Bed Mining in the Law of the Sea Convention* (Oxford: Clarendon Press, 1989) at 23.

¹⁶ S.E. Doyle, “Concepts of Space Law before Sputnik” in *Proceedings of the 40th Colloquium on the Law of Outer Space* (1997) 3 at 10.

¹⁷ (Quoted by in A.A. Cocca, “The Common Heritage of Mankind: Doctrine and Principle of Space Law - an Overview” in *Proceedings of the 29th Colloquium on the Law of Outer Space* (1986) 17 at 17.

¹⁸ Schmidt, *op.cit.*, at 24

¹⁹ *Ibid.* at 23

²⁰ N. Jasentuliyana, “The Development of the Outer Space Treaties and Legal Principles from a Third World Perspective” in *Proceedings of the 40th Colloquium on the Law of Outer Space* (1997) 57 at 58

²¹ Schmidt, *op.cit.*, at 23.

²² G.M. Danilenko, “The Concept of the “Common Heritage of Mankind” in International Law” (1998) XIII *Ann. of Air and Sp. L.* 247 at 250.

that calls for “ensuring that all nations, not only the powerful and rich, benefit from its exploration and exploitation” through its “effective management”.²³

According to Danilenko, the developing world attempted to use the CHM concept during the negotiations for the 1982 United Nations Convention on the Law of the Sea and the 1979 Moon Agreement in order to establish a framework for exploiting the resources of the Moon and of the sea-bed. The CHM would secure the direct participation of the developing world in the exploitation and international management of these resources, would prevent their monopolization by the developed countries where the developing world does not yet have the technology or financing necessary, and would distribute the benefits “primarily in the interests of the developing countries”.²⁴

As can be seen from the long history outlined above, the CHM paradigm underwent many changes – from a Creation open for homesteading and partition as seen by Locke and Seward - to its contemporary, egalitarian incarnation. The analysis will concentrate on its later form.

IV. THE CONTENTS OF THE COMMON HERITAGE OF MANKIND

Whereas Stanley B. Rosenfield deemed the CHM doctrine as being “without legal context [;] [a]ny meaning, and legal import, must be indicated by added principles”,²⁵ Article 11.1 of the MA is clear enough in stating that “the common heritage of mankind ... finds its expression in the provisions of this Agreement, in particular in paragraph 5 of this article”.

Hanneke Van Traa-Engelman considers that the above tenet broke the “deadlock in the discussions on the applicability of the [CHM] doctrine as a legal concept”, yet “the material content of the concept can still be subject to discussion”.²⁶ Indeed, as recognized by Maurice Andem, its provisions have been subject to conflicting interpretations.²⁷ According to Francis Lyall, it is becoming accepted that, in any incarnation of it, the CHM concept presents a number of particular elements, namely:

that certain regions should not be subject to national appropriation in any way, that there will be a management system for such an area, that the managers, be they state or international organisation, will act as representative of mankind, that any benefits from such areas will be shared internationally, and that the area will be used for peaceful purposes only.²⁸

²³ (Quoted in A.G. Vicas, “The New International Economic Order and the Emerging Space Regime” in *Space Activities and Implications: Where from and where to at the Threshold of the 80's: Proceedings of the Symposium held on October 16-17, 1980* (Montreal: McGill University, 1980) 293 at 301-302.

²⁴ Danilenko, *op.cit.* at 250.

²⁵ (Quoted by L. Wiewiorowska, “Implications of the Moon Agreement for the Legal Status of Outer Space” in *Proceedings of the 23rd Colloquium on the Law of Outer Space* (1980) 83 at 84.

²⁶ H.L. Van Traa-Engelman, “The Moon Treaty - Legal Consequences and Practical Aspects” in *Proceedings of the 23rd Colloquium on the Law of Outer Space* (1980) 73 at 76.

²⁷ M.N. Andem, “Twentieth Anniversary of the 1979 Moon Treaty: The Legal Status of the Moon and Other Celestial Bodies Revisited in the Light of the Commercialization of Outer Space Activities” in *Proceedings of the 42nd Colloquium on the Law of Outer Space* (1999) at 4.

²⁸ F. Lyall, “On the Moon” (1998) 26 *J. of Sp. L.* 129 at 132.

Alan Marshall agrees that the CHM is “not a well-defined concept”, yet his “own predilections” suggest that the paradigm comprises the following traits:

- 1) non-appropriation (this is adequately encapsulated in the Moon Treaty, but is deficient in the Outer Space Treaty);
- 2) universality of applicability (to all states and to all parts of space, including space itself; this would thus make nations and private firms liable for rent payment with regard to orbital occupation);
- 3) universality of formulation (so that all states participate in the drawing up of space law);
- 4) equitable distribution of space resources (the meaning of equitable being decided by all states);
- 5) the use of space for peaceful purposes...²⁹

The vision of an economic system in outer space whereby property shall be controlled by a UN body and communally owned by all the nations is considered by Michele Hamilton as “nothing more than communism: a communal system of ownership where private property rights and free market principles simply do not exist”.³⁰ Indian scholar V. S. Mani acknowledges the view of the developed countries, who regarded the CHM concept as being:

the institutionalisation of the ‘menace’ of international socialism (read communism), proliferation of international bureaucracy, and threat to their technological superiority – in short ... an anathema to everything the Western capitalist ideology stood for.³¹

The idea that the CHM is a socialist/communist concept is not far-fetched; indeed, both the legal analysis and the diplomatic statements support this view. Whereas several of the above characteristics do not pertain *ratione materiae* to the subject of this paper, an analysis is needed as to the property implications of the MA.

It is important to point out that the CHM as envisaged by the Moon Agreement is not the same with the CHM envisaged by the international law of the sea documents. The UN General Assembly declared, in December 1969, a moratorium on the exploitation of the deep seabed resources pending the establishment of an international regime for the development thereon. No such moratorium has ever been proclaimed for the extraterrestrial celestial bodies. This is perhaps due to the general opinion that the exploitation of the manganese nodules of the deep seabed is more feasible with the current technology, whereas that of the Martian resources pertains to a more distant future – hence in a lesser need for regulation. The language of the Montego Bay Convention - as per its 1982 incarnation - is also tougher than the language of the MA. Article 137 of the UNCLOS, outlining the legal status of the “Area” and its resources, provides:

²⁹ A. Marshall, “Development and Imperialism in Space” (1995) 11 *Sp. Pol’y* 41 at 52.

³⁰ M. Hamilton, “The application of the Fifth Amendment to Property Rights in Outer Space” in *NSS Conference ‘Property Rights and Commercial Space Development’, Washington, 2 December 1998*.

³¹ V.S. Mani, “The Common Heritage of Mankind: Implications for the Legal Status of Property Rights on the Moon and Celestial Bodies” in *Proceedings of the 39th Colloquium on the Law of Outer Space* (1996) 31 at 33.

1. No State shall claim or exercise sovereignty or sovereign rights over any part of the Area or its resources, nor shall any State or natural or juridical person appropriate any part thereof. No such claim or exercise of sovereignty or sovereign rights nor such appropriation shall be recognized.

2. All rights in the resources of the Area are vested in mankind as a whole on whose behalf the Authority shall act. These resources are not subject to alienation. The minerals recovered from the Area, however, may only be alienated in accordance with this Part and the rules, regulations and procedures of the Authority.

3. No State or natural or juridical person shall claim, acquire or exercise rights with respect to the minerals recovered from the Area except in accordance with this Part. Otherwise, no such claim, acquisition or exercise of such rights shall be recognized.

The 1994 Agreement relating to the Implementation of Part XI of the Montego Bay Convention softens the hard-line provisions of the UNCLOS, given the “political and economic changes, including market-oriented approaches, affecting the implementation of Part XI” – as noted in its Preamble. The 1994 Agreement has greater legal force than the Convention (Article 2.1). Whereas this is not the place for examining the legal status of the deep seabed or the oceanic incarnation of the CHM, the above example has been given as a means of illustrating the lack of uniformity – territorial and temporal – of this concept.

A. The Prohibition of Private Landed Property

Article II of the Outer Space Treaty prohibits the national appropriation of the extraterrestrial realms. While this denies, in practice, the private appropriation of the same, Article 11.3 of the Moon Agreement contains a facial prohibition of landed property in outer space:

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.

Libertarian commentator Edward L. Hudgins believes that the model for the Moon Agreement, where “[p]rivate property is explicitly banned”, is the Soviet constitution.³² Indeed, whereas Article 13 of the 1977 Constitution of the USSR allowed Soviet citizens to own “articles of everyday use, personal consumption and convenience, the implements and other objects of a small-holding, a house, and earned savings”, this did not apply to land. According to Article 11, “[t]he land, its minerals, waters, and forests are the exclusive property of the state”, private citizens being provided, by means of Article 13, with a limited *jus utendi*:

Citizens may be granted the use of plots of land, in the manner prescribed by law, for a subsidiary small-holding (including the keeping of livestock and poultry), for fruit and

³² E.L. Hudgins, “Martian Law” *Cato White Papers and Miscellaneous Reports* (15 August 1988), online: <http://www.cato.org/pubs/wtpapers/980815paper.html>.

vegetable growing or for building an individual dwelling. Citizens are required to make rational use of the land allotted to them.

Article 10 placed the “socialist ownership of the means of production” at the “foundation of the economic system of USSR”, whereas the “principal form of socialist property” in Soviet Union was State property, defined by Article 11 of the Soviet basic law as “the common property of the Soviet people”.

Adding up Articles 11 and 13, it can be seen that all land and resources in the USSR were the common property of the Soviet people, while individuals could own a house, the implements of a farm, and could exercise user rights over the land granted to them for subsistence farming and dwelling. The Moon Agreement considers all land and resources on Mars as the common heritage of the Mankind (article 11.1), while individuals can own planetary stations, vehicles, equipment, facilities and installations (Article 12.1), and can exercise user rights over a limited area which is required for the needs of the station (Article 9.1).

Article 11 of the Moon Agreement is in resonance with the 1848 Manifesto of the Communist Party, whereby Karl Marx and Friedrich Engels called for the “[a]bolition of property in land and application of all rents of land to public purposes”, entrusting the proletarians with the mission “to destroy all previous securities for, and insurances of, individual property”. This is the core belief of Communism; as acknowledged in the same document: “[T]he theory of the Communists may be summed up in the single sentence: Abolition of private property.”³³

B. The “Equitable” Sharing of *Jus Fruendi*

The key tenet of the CHM is the distribution of benefits. As an attribute of property, *jus fruendi* embodies the right to enjoy the income (fruits) derived from an asset. The private property in the resources extracted from Mars cannot be fully enjoyed under the CHM, as Article 11.7.d of the MA provides for:

[a]n equitable sharing by all States Parties in the benefits derived from [the natural resources of Mars], 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 [Mars], shall be given special consideration.

In the 1979 report of the Independent Commission on International Development Issues, titled “North-South: A Program for Survival”, the commission chaired by Willy Brandt considered that “‘Global commons’ is a neat catchword, but hardly appropriate”, because:

[i]t connotes villagers in medieval England who have the right to pasture their cattle in the village commons. The space analogy is nations ‘pasturing’ their satellites in

³³ *Manifesto of the Communist Party*, *supra* note 6.

the global commons. The term connotes something of free access to outer space, but none of the distributional aspects of the ‘common benefit’ or ‘common heritage’.³⁴

Indeed, whereas a *res communis* offers free access, it does not entail a share of the benefits. The villager pasturing his cow in the village commons needed not share the meat and milk with the other villagers, even if originated from the grass grazed from a common pool. In contrast, under the CHM regime, the Mars miner has to share with all other humans what his equipment extracted. According to Stephen Gorove, as long as the space powers do not ratify the MA, their private enterprises are “entitled to acquire and retain space resources” for their own disposition “without limitation on possible profit”.³⁵

Lenin defined Socialism as the “social ownership of the means of production and the distribution of products according to the work of the individual”; in his view, socialism will “ripen into Communism, whose banner bears the motto: ‘From each according to his ability, to each according to his needs’”.³⁶ Christopher Pinto, Sri Lanka’s ambassador to the Law of the Sea Conference expressed the view of the developing countries that the CHM, as incarnated in the Law of the Sea Convention, implements the principle according to which “each country will contribute according to its capacity and each will receive according to its needs”.³⁷ The tenets of the Moon Agreement hold middle ground between Socialism and Communism, providing for a share of the Martian benefits from each according to his ability, to some according to their work and to some according to their needs.

The CHM, as incarnated in the MA is even more radical than the Soviet doctrine. Article 18 of the 1918 RSFSR Constitution considered work as being the duty of every Russian citizen, proclaiming as its motto: “He shall not eat who does not work”. Article 14.2 of the 1977 Soviet Constitution provides that “[t]he state exercises control over the measure of labor and of consumption in accordance with the principle of socialism: ‘From each according to his ability, to each according to his work’”.

The 1918 Soviet contribution obliges every citizen to work; no part of *corpus juris spatialis* obliges any State to explore and use the Moon. Article I of the OST asks States to “facilitate and encourage international co-operation” in the scientific investigation of the extraterrestrial realms, whereas Article 4.2 of the MA expects that “[i]nternational co-operation in pursuance of this Agreement should be as wide as possible and may take place on a multilateral basis, on a bilateral basis or through international intergovernmental organizations.” Nonetheless, the exploration and use of Mars is a freedom, not an obligation. Whereas Article 11.7 of the MA does give “special consideration” to the efforts of the countries having contributed to the exploration of Mars, this is not the only basis for assigning *jus fruendi*: the “interests and needs of the developing countries” – whether explorers or not – are part of the benefit distribution equation.

³⁴ quoted in Vicas, A.G., 1980. The New International Economic Order and the emerging space regime. In: *Space activities and implications: where from and where to at the threshold of the 80's, Proceedings of the Symposium held on October 16-17, 1980*. Montreal: McGill University, p. 293, at p.303.

³⁵ S. Gorove, “Private Rights and Legal Interests in the Development of International Space Law” (1985) 5 *Sp. Man.* 226 at 227.

³⁶ V.I. Lenin, *The Tasks of the Proletariat in Our Revolution* (Priboi Publishers, 1917).

³⁷ (Quoted in Danilenko, *op.cit.* at 257).

According to Brian M. Hoffstadt, the meaning of “equitable” in the Moon Agreement creates uncertainties, especially as to its impact upon the amount of profit private companies will be allowed to keep. He deems that no investment will occur until “equitable” is defined and the profit distribution is settled.³⁸

Although not a contracting party to the MA, the US distributes globally some of the benefits from its space activities. A number of lunar samples have been given, free of charge, to other countries, although their extraction was sponsored by the US tax payer. In the same time, NASA surrendered the copyright for still images, audio files and video, subject to certain conditions.³⁹ This is done subject to a different benefits provision, where no distributive system is envisaged and no “regime” exists for distributing the same. Article I of the Outer Space Treaty provides that:

The exploration and use of [the celestial realms] 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.

Article 4.1 of the Moon Agreement repeats, in a different wording, the above clause, adding that:

[d]ue regard shall be paid to the interests of present and future generations as well as to the need to promote higher standards of living and conditions of economic and social progress and development in accordance with the Charter of the United Nations.

State practice indicates that, under the terms of Article I of the Outer Space Treaty, States are willing to share the scientific results from space exploration, yet not the profits stemming from commercial space activities.

On December 13th, 1996, the UN General Assembly adopted a “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” (A/RES/51/122). The Declaration evokes the provisions of the OST, without making any reference to the provisions of the MA. An important principle is contained in Paragraph 2 of the above document, allowing States the freedom to determine, on an equitable and mutually acceptable footing, all the facets of their participation in international cooperative ventures in the exploration and use of space. A special attention is paid to the contractual terms in cooperative ventures, which ought to be fair, reasonable, and fully conform to the legitimate interests and rights of the contracting parties. Whereas Paragraph 3 calls countries with more advanced space capabilities to be particularly aware to the interest and benefit of countries with incipient space programmes and developing countries stemming from cooperative space activities conducted with them, no reference whatsoever is made to the distribution of profits from non-cooperative ventures.

According to Marietta Benkö and Kai-Uwe Schrogl, the above declaration denounced the “forced cooperation and dirigist approaches for reaching redistribution”, stressing in the same time the “freedom of cooperation and the need for effectiveness in international

³⁸ Hoffstadt, *op.cit.*, at 591-592.

³⁹ NASA, 2008. *Using NASA imagery and linking to NASA web sites* [online], 12 May. Available from: http://www.nasa.gov/audience/formedia/features/MP_Photo_Guidelines.html [accessed 23 May 2011]

cooperation". In their view, shared by us, the 1996 declaration came at the right time, in order to spell out that "no distributive or systemic conflict in the field of space applications and cooperation is alive".⁴⁰

V. ARGUMENTS FOR THE COMMON HERITAGE OF MANKIND

It is undeniable that law and politics are intertwined. Since the CHM concept lies on the left of the political spectrum, it is favoured by those who support, with various degrees: collectivism rather than individualism; internationalism instead of nationalism; cooperation more than competition; the economic interests of the have-nots before those of the haves; economic equality more than economic liberty; redistribution of wealth instead of acceptance of inequalities; equity as opposed to efficiency, or fair outcome as opposed to fair process; interventionist versus laissez-faire economics; bigger versus smaller government. All these common traits of socialist ideology can be found in the CHM paradigm.

Many arguments are emotional, making appeal to the "brotherhood of Man". For instance, Indian scholar V. S. Mani hopes that the space-faring states will "rise above their short term, narrow, Shylockian view of profits" and show instead "magnanimity, compassion and camaraderie to the whole international community".⁴¹ Alan Marshall views the CHM paradigm and its adoption into a regulatory regime as a repellent of space imperialistic tendencies. He believes that the "mildness" of its prescriptions would entail the support of "many, maybe most, space enthusiasts". Those holding a contrary view are seen as either more interested in the personal profit they could make from space endeavours, or eager to forgo the "rights and concerns of many of the world's people" for the sake of outer space expansion.⁴² On a similar line of reasoning, Maurice Andem believes that the unpopularity and non-acceptance of the Moon Agreement is due to the fact that individualistic national interest is given priority over the common interest of the humankind as a whole. He considers that the CHM principle conveys a universal truth shared by the main religions, expressing the common origin of the human race.⁴³

Francis Lyall agrees that the CHM principle is a major reason behind the lack of a stronger support for the Moon Agreement, and finds some weight in the argument that the have-nots are freeloading. He reckons that the said paradigm is an endeavour by the nations whose technical or other ineptitudes preclude them from exploiting the space resources, to induce spacefaring nations into investing "time, trouble and finance in a project, and then divert to non-participants and non-investors some of the rewards of these entrepreneurial activities". Yet Lyall is wary to fully dismiss the CHM, whose core he views as a moral imperative to preserve and foster if one is to avoid barbarity: "'Have' and 'have-not' are too intertwined nowadays for the one to neglect the interests of the other". He is in expectative as to whether the CHM benefits in the law of the sea will indeed reach the peoples of the developing world or will instead be hijacked by their rulers, yet the opportunity for abuse is not

⁴⁰ M. Benkő & K-U Schrogl, "Space Law at UNISPACE III (1999) and Beyond" in *Proceedings of the 40th Colloquium on the Law of Outer Space* (1997) 157 at 159.

⁴¹ Mani, *op.cit.*, at 36.

⁴² Marshall, *op.cit.*, at 52.

⁴³ Andem, *op.cit.* at 7-8.

considered by Lyall as enough of a reason to shelve the CHM concept.⁴⁴ Daniel Goedhuis considers that, while the CHM concept in its space law embodiment did not reduce the inequalities between the developing and developed states to the extent initially sought, it would be nonetheless “difficult to think of an alternative system which, in the light of the present factual situation, could have been devised”.⁴⁵

While socialist attitudes from Western analysts are not surprising, what is paradoxical is the eventual lack of support for the Moon Agreement from the very nations it was to benefit. It is also surprising that neither the USSR, nor China or any other Communist nation acceded to it. By 2011, the document has been ratified only by Australia, Austria, Belgium, Chile, Kazakhstan, Lebanon, Mexico, Morocco, the Netherlands, Pakistan, Peru, Philippines, and Uruguay.

As a parenthesis to the CHM paradigm, space collectivism is favoured also at a smaller scale, to some extent on practical grounds. Kalani Chapman envisages a settlement on Mars modelled on the kibbutz system, where the sense of community will be emphasized “to an infinitely greater extent than the dominant western capitalistic culture on Earth does today”. Chapman’s settlement would see the basics for survival (air, water, food and shelter) unconditionally provided for each member. The chief values of the community will be cooperation and mutual aid as opposed to capitalist exploitation. In the early stages – considers Chapman – settlers will work for the sake and the goals of the community, carrying out the functions they excel most at or they most desire: “[E]ach member will contribute what he/she/it can, and each will be provided for (‘From each according to his ability, to each according to his needs’)”. Nonetheless, once the extraterrestrial settlement is largely self-sustaining and automatic systems are established, “people will be free to do as they please”.⁴⁶

VI. ARGUMENTS AGAINST THE COMMON HERITAGE OF MANKIND

In 1987, US President Ronald Reagan famously differentiated between communists – those who read Marx and Lenin – and anti-communists – those who understand Marx and Lenin.⁴⁷ The critics of the CHM paradigm seem to have a thorough understanding of the flaws plaguing this system.

Addressing the Scottish Unionist Conference in 1948, Winston Churchill called socialism “a deadly fallacy ... the philosophy of failure, the creed of ignorance and the gospel of envy”.⁴⁸ A criticism of the CHM paradigm is a criticism of communism and socialism. The main argument in opposing the CHM is that communism has failed on earth, and there is no reason this will not happen in outer space. According to Glenn Reynolds,⁴⁹ the anti-market and statist ideas embodied in the Moon Agreement and NIEO have been discredited by the countries that have embraced them. The Soviet Union has ceased to exist,

⁴⁴ Lyall, *op. cit.*, at 132-134.

⁴⁵ D. Goedhuis, D. Report on the Desirability of States Ratifying the Moon Treaty of 1979 in *São Paulo Conference on the Law of the World, August 16-21, 1981* (Washington, D.C.: World Peace through Law Center, 1981) at 8.

⁴⁶ K. Chapman, “Thoughts from a Settlement on Mars” (1995) 6 *The Manoa Journal of Fried and Half-Fried Ideas (about the future)*.

⁴⁷ (Quoted in A. Pryor, *Little Known Tales in Nevada History* (Stagecoach Publishing, 2003) at 23.

⁴⁸ W. Churchill, *Never Give In! - The Best of Winston Churchill's Speeches* (Hyperion, 2003) at 446.

⁴⁹ G.H. Reynolds, “The Moon Treaty: Prospects for the Future” (1995) 11 *Sp. Pol’y* 115 at 118.

and the former socialist countries of Eastern Europe reverted to democracy and the market economy almost two decades ago. African-American analyst Thomas Sowell wrote that academic Marxists in the US are nonetheless “utterly undaunted” by the collapse of communism throughout Eastern Europe: “Socialism in general has a record of failure so blatant that only an intellectual could ignore or evade it”.⁵⁰ The arguments *infra* – true as they be – can be equally ignored or evaded.

A number of authors oppose the CHM approach as an antithesis to property rights, seen as essential for the development of space. Michelle Hamilton considers the problems plaguing the paradigm as being obvious; the lack of a strong protection of private property rights eliminates the incentive for private investors to mine the extraterrestrial ore, to develop the know-how associated with this and to get involved in countless other uses of the celestial bodies. She believes that the telecommunications industry would not have reached its current level if the communal approach paradigm would have been applied to satellite development.⁵¹ Michel Smirnoff criticized a draft of the Moon Agreement, deeming that one needs to be realist when it comes to the terrestrial exportation of the lunar resources:

If the States which spent the huge sums for the exploration of the Moon will not have the legal possibility to exploit those resources, then they will be confronted with two possibilities: 1 - to stop the explorations or 2 - to continue those explorations ignoring the non-realistic formulations of the Treaties.⁵²

According to Alan Marshall, a supporter of the CHM paradigm, the prospect that companies could have to rent the site of extraction from the global community would “provoke yelps of horror from space capitalists whose ideological tradition would make them reply that those who take the risk and invest the capital should reap the rewards”.⁵³ From an opposite ideological stand, Michael Listner considers, indeed, that “[i]t’s no wonder that private enterprise is loath to invest in technologies to exploit space with these conditions hanging over their heads”.⁵⁴ H.A. Wassenbergh deems that the CHM concept is too idealistic, as it takes for granted a very strong international solidarity.⁵⁵ Whereas such a situation is utopian, each country tending for its own interests, the much-hated capitalist ideological tradition is quite functional.

Another disparagement of the CHM model pertains to the capacity of the developing world to evolve through its own means, and to the progress of the economy. P.J. O’Rourke explains that collectivism does not work due to the faulty economic premise it is based on. In his view:

⁵⁰ T. Sowell, *Barbarians Inside the Gates - And Other Controversial Essays* (Hoover Institution Press, 1999) at 104.

⁵¹ Hamilton, *op.cit.*

⁵² M. Smirnoff, “The Need for a Treaty on the Legal Status of the Moon” in *Proceedings of the 15th Colloquium on the Law of Outer Space* (1972) at 73.

⁵³ Marshall, *op.cit.*, at 51.

⁵⁴ M.J. Listner, “It’s Time to Rethink International Space Law” *The Space Review* (31 May 2005): <<http://www.thespacereview.com/article/381/1>>.

⁵⁵ H A Wassenbergh, *Principles of Outer Space Law in Hindsight* (Martinus Nijhoff Publisher, 1991) at 82.

There is no such thing as a person's 'fair share' of wealth. The gross national product is not a pizza that must be carefully divided because if I get too many slices, you have to eat the box. The economy is expandable and, in any practical sense, limitless ... The lesson of economic development is that what happens when we run out of a resource is what happened when we ran out of whale oil – nothing.⁵⁶

A critic of the Communist Manifesto, W.J. Rayment,⁵⁷ considers that, while Marx was right in viewing the world in terms of class struggle, he failed to understand that efficiency would lead to an increasing affordability of the means of production. Free societies would elevate the working class to the entrepreneur class, instead of bringing society down to the lowest common denominator. Indeed, Rayment's logic is supported by the evolution of India and the People's Republic of China into space-faring powers, a tangible proof that developing nations can – and will – participate in the development of space resources. Reynolds remarked as well that space capability is no longer a "superpower monopoly", exemplifying with the credible space programs of the two nations mentioned above, opinion leaders of the developing world.⁵⁸ At his turn, space entrepreneur Jim Benson finds the argument that less developed countries are unable to participate in space as currently unsubstantiated. While in the past it was believed that deep space science and resource exploration missions needed to cost billions of dollars, rapidly advancing miniaturization decreased the cost with about an order of magnitude per mission generation, putting it within the reach of any country in the world that wishes to participate at \$12 million or less for a deep space experiment.⁵⁹ Indeed, due to the limitless resources of outer space and to the evolution of the developing world into players in the space arena, it does not matter whether the latter do not hold the pole position in the new commercial space race.

Another reason for criticizing the CHM regime is that it is an expression of the "culture of entitlement". This has been described by Judith Bardwick as being:

an attitude where people believe they do not have to earn what they get. They believe they deserve ... [and] are owed it because of who they are, not because of what they do. In such a culture people take what they have for granted, keep asking for more, and are never satisfied.⁶⁰

Dave Anderson laments the whole society having moved toward a culture of entitlement over the years, an ethos whose motto is "[w]eaken the strong to strengthen the weak".⁶¹ Keith Urbahn laments as well the "culture that promotes widespread dependence on government handouts". In his view, a society of entitlement rates justice "not by how much the government encourages those who succeed, but by how much it rewards those who

⁵⁶ P.J. O'Rourke, *American Spectator's Enemies List* (Atlantic Monthly Press, 1996) at 154.

⁵⁷ W.J. Rayment, *Analysis of the Communist Manifesto* (2000) online: <<http://www.indepthinfo.com/communist-manifesto/analysis.shtml>>.

⁵⁸ Reynolds, *op.cit.*, at 118.

⁵⁹ J.W. Benson, "Space Resources: First Come First Served" in *Proceedings of the 41st Colloquium on the Law of Outer Space* (1998) 46 at 48-49.

⁶⁰ (Quoted in D. Anderson, "Changing a Culture of Entitlement into a Culture of Merit" (2002) *The CPA Journal* online: <<http://www.nyssepa.org/cpajournal/2002/1102/nv/nv8.htm>>).

⁶¹ Anderson, *op.cit.*

don't". In his view, this equates with a "license for mediocrity", denying individual responsibility and creating convenient excuses for failure.⁶² Instead, as explained by John Locke, the world was given:

to the use of the industrious and rational, ... not to the fancy or covetousness of the quarrelsome and contentious. He that had as good left for his improvement, as was already taken up, needed not complain, ought not to meddle with what was already improved by another's labour: if he did, it is plain he desired the benefit of another's pains, which he had no right to, and not the ground ... whereof there was ... more than he knew what to do with, or his industry could reach to.⁶³

What is more worrying is that the CHM concept goes even beyond Marxism. In terms of international space economics, the developing countries are not the equivalent of the proletariat – a productive class – but of the lumpenproletariat. The have-nots are not lunar wage-workers whose surplus labour would be exploited by the lunar bourgeoisie. In fact, the true working class of the space economy would be the spacefaring states, upon which the freeloading have-nots would depend as the lumpenproletariat depends upon the bourgeoisie.

What will, then, make the Martian desert flourish? The homesteading movement in the United States received momentum from the fact that it would promote the settlement of the High Plains, regarded until 1862 as the "Great American Desert".⁶⁴ The homesteading paradigm – not the Common Heritage of Mankind – is likely to transform the Martian desert in the same manner as it transformed the 19th Century United States.

VII. CONCLUSION

The analysis above, and the terrestrial history of communism, proves that Marxism is a fallacy. Outer space needs to be spared the painful experience of the former Eastern Bloc. Despite the noble ideals of equity and care for the have-nots, the CHM paradigm has more faults than merits. A refutation of the Common Heritage principle does not mean, however, that the developing world will, or should, be left behind in the space era. China, India and Brazil are living proof that a developing country can, through its own effort, join the space-faring club. Instead of freeloading on the efforts of the older space-farers, the have-nots should pool their meagre financial resources into a common space agency or into regional ones, and proceed at exploiting the riches of outer space for themselves. The rallying cry of Marxism – "Proletarians of all countries, unite; you have nothing to lose but your chains" should evolve into "Countries of the world unite – you have nothing to lose but the chains of gravity". The skies are open.

⁶² K. Urbahn. "Putting the Torch to a Culture of Entitlement" *Yale Daily News* (23 March 2005).

⁶³ Locke, *op cit.*, C. 5, sec. 34.

⁶⁴ R.M. Robbins, *Our Landed Heritage: The Public Domain, 1776-1936* (Princeton University Press, 1942) C. XIV.

SESSION 2: REGIONAL ORGANISATIONS IN ASIA

ASIA-PACIFIC SPACE COOPERATION ORGANIZATION AS A REGIONAL CENTER FOR SPACE LAW RESEARCH

Haifeng Zhao

Abstract: Space cooperation in Asia shows a new prospect since the establishment of the Asia-Pacific Space Cooperation Organization (APSCO), but also has brought a new impetus to the space law teaching and research in the Asia-Pacific region. In Asia, although the establishment of an Asian Space Agency and an Asian Center for Space Law has long held great appeal, because of Asia-Pacific special historical, cultural, political and geographic factors, it is difficult to establish a unified Space Cooperation Organization in Asia, and similarly, it is also not easy to establish a unified Asian Center for Space Law. In contrast, APSCO, which was established in 2006, in Beijing and composed by eight parties, has laid the foundation for the establishment of an Asia-Pacific Center for Space Law (APCSL). Currently, under the framework of APSCO, the establishment of the APCSL has received political support from Member States of the APSCO. Then, how to establish the Center? How to draw on the experience of the European Centre for Space Law (ECSL) to develop it? What are its functions in the field of space law teaching and research? How it affects the legal governance of the APSCO? How about its relationship with Member States will be? How to deal with its relationship with non-members of Asia-Pacific region? These are the contents that this paper will explore.

I. INTRODUCTION

This paper is intended to research the necessity and feasibility of establishing an Asia-Pacific Center for Space Law (APCSL) under the framework of the Asia-Pacific Space Cooperation Organization (APSCO). In doing so, it looks at how to draw on the experience of the European Centre for Space Law (ECSL) to establish it so as to promote the teaching and research of space law, and to strengthen capacity-building in space law at regional and national levels.

II. ASIA-PACIFIC SPACE COOPERATION AND THE ESTABLISHMENT OF APCSL

Currently, space cooperation is booming all over the world, including the Asia-Pacific area. Space law can play a guiding role in the process of space cooperation, and space law cooperation is also an important component of space cooperation. Since 2008 UN COPUOS Legal Subcommittee took national capacity-building in space law as a new item in its agenda, the Subcommittee has discussed it every year, which fully demonstrates the value of the issue and the attention paid by international community. Then, what role can a regional space cooperation organization play in building capacity in space law? Relevant to this issue, ECSL, created by ESA, is an outstanding model, during the 23 years from its establishment to today, it has and continues to play an enviable role in spreading space law knowledge in Europe and promoting space law teaching and research. Outside the region, it will also serve as an example for the establishment of a similar organization in Asia.

· Dean and Professor, School of Law, Harbin Institute of Technology (H.I.T.), Director, Institute of Space Law, H.I.T. The views of this paper are those of the author and do not represent any organization.

A. An Overview of Asia-Pacific Space Cooperation

In addition to national cooperation with relevant United Nations agencies as well as bilateral cooperation, Asia-Pacific space regional cooperation mainly embodies in several decentralized cooperation forums, which are organized by Japan, China, India and other space powers.¹ These include the Asia-Pacific Space Cooperation Organization (APSCO), headquartered in China, the Asia-Pacific Regional Space Agency Forum (APRSF) which takes Japan as the core, the Centre for Space Science and Technology Education in Asia and the Pacific (CSSTEAP) set up in India, and so on. This kind of cooperation reflects a dispersion, which means there is no formal and close space cooperation organization to accommodate all or most of the Asian countries, like the European Space Agency.

Established in 1993, APRSF has many participants: as of December 2010, there are 269 members, representing space agencies, government entities, international organizations, enterprises and universities from more than 30 countries and regions, including the United Nations, which makes it become the largest space conference platform in Asia. APRSF provides an open and flexible cooperative framework, but it does not have legal personality, it is a kind of flexible cooperation. APSCO was established in 2006 and is headquartered in Beijing, China. Composed of Bangladesh, China, Iran, Mongolia, Pakistan, Peru, Thailand and Turkey, it is a intergovernmental cooperation organization with legal personality, it is the second regional inter-governmental space cooperation organization after ESA, officially beginning operations in 2008. It is currently actively developing a range of cooperative space projects, and actively expanding its member states.² The Centre for Space Science and Technology Education in Asia and the Pacific was formally established on November 1, 1995, in India, it was set up by the decision of United Nations Office for Outer Space Affairs. Its purpose is to carry out further education and training of space science and technology. It currently has 15 member States. The above cooperation has sub-regional character, which may result in repeated programs and waste of resources. Therefore, some scholars are also exploring better ways.

B. The Idea of Establishing an Asian Space Agency and an Asian Center for Space Law

Referring to the regional space cooperation in Asia, South Korea Professor Doo Hwan Kim had proposed the idea of establishing the Asia Space Agency and the Asian Center for Space Law in 2001.³ In his view, this is a practical proposal, and will be good for the establishment of the Asian organization to firstly depend on national political will.⁴ In his view, the need for the establishment of these institutions arises from the need to address expanding competition between Asian countries on the one hand and the United States, Russia, Canada, European Union and other developed countries on the other. If Asian countries get together and strengthen cooperation in space research, it can benefit all Asians. He also proposed to set up an Asian Center

¹ Haifeng Zhao, "Current Legal Status and Recent Developments of APSCO and Its Relevance to Pacific Rim Space Law and Activities" (2009) 35 J. Space L. 559-598.

² *Ibid.*

³ Doo Hwan Kim, "The Possibility of Establishing an Asian Space Agency" (2001) S.J.I.C.L 214 at 218-219.

⁴ *Ibid.* at 214-226.

for Space Law as the beginning step of establishing Asian Space Agency.⁵ But based on the current situation, Asian countries' history, politics, economy and culture all decided that it is very difficult to establish a close regional cooperation organization which accommodates all Asian countries.⁶ So the lack of a regional space cooperation organization ensures that the establishment of a regional Center for Space Law also lacks institutional support and budgetary sources, and thus making it difficult to establish. Indeed, even if it is established in some context, it will lack the support for actually organizing activities. However, the establishment and operation of APSCO have laid a solid institutional foundation and guarantee activities for the establishment of the Asia-Pacific Center for Space Law.

II. THE NECESSITY AND FEASIBILITY OF ESTABLISHING AN APCSL

A. *The Necessity*

The needs for an APCSL are to be found in the same needs underlying the European project. The reasons for the establishment of ECSL included improving the status of space law research and knowledge in Europe, to benefit scholars, students and practitioners, and also to benefit the development of the European Space Agency established in 1975 and to improve the ESA image.⁷ These reasons also apply to the argument of the necessity to establish the Asia-Pacific Center for Space Law.

First, the Asia-Pacific region needs to strengthen space law education, training and research, and to strengthen its capacity-building capabilities in space law. Within the Asia-Pacific region, with the exceptions of Japanese, Korean and Indian national space law teaching and research, and the recent strengthening of Chinese space law teaching and research,⁸ generally speaking, most space law education, training and research in the region remains relatively backward and weak. Therefore, it needs regional institution to play a role, to promote space law teaching and research in the Asia-Pacific region. In this regard, the United Nations and the International Institute of Space Law can play some role, but it still should establish and develop a more powerful and effective organization at a more localized level, so the establishment of APSCSL is necessary.

Second, an international space cooperation organization like APSCO, due to the implementation of space activities in its process of development, will also soon encountered a series of legal problems. These include the relationship between the basic law and secondary law, including the institution's own governance mechanisms, and particularly with respect to issues concerning the registration of, and the liability and compensation resulting from its space activities, the relationship between APSCO and Member States, and its relationship with the major international space law treaties. Because these also need to be studied and clarified, therefore, for the protection of APSCO's own interests and the improvement of its image, it also needs

⁵ *Ibid.* See also Doo Hwan Kim, "The National Space Programme, Policy and Legislation in Korea" (Presentation at the Space Law Conference, Beijing, China, 25-27 April 2004).

⁶ Haifeng Zhao, "Asia Pacific Space Cooperation Organization Convention" in *Proceedings of the Fiftieth Colloquium on the Law of Outer Space*, (AIAA Publications, 2008) at 3-13 [Zhao, "APSCO Convention"].

⁷ Sergio Marchisio, "Ways and Means of Promoting Education in Space Law in Africa" in *Meeting International Responsibilities and Addressing Domestic Needs: Proceedings of the United Nations/Nigeria Workshop on Space Law* (UNOOSA, Vienna, 2006) at 172.

⁸ Haifeng Zhao, "The Progress of Teaching and Research of Outer Space Law in China" in *Proceedings of the Institute of Space Law* (AIAA Publications, 2010) at 3-13.

to establish APCSL similar to ECSL.

Finally, at present, the space activities in the Asia-Pacific region are relatively active, because Asia Pacific region has such space powers as Japan, China and India. South Korea has also become an active and vigorous country. However, with respect to national space legislation, besides Japan and Korea, others are all in a relatively backward situation compared with their space activities. National space legislation needs to be strengthened; at the same time, the situation of Asia-Pacific countries to sign and conclude international space law instruments is not optimistic. Law can regulate and guide associated activities, and it plays the same role in the field of space activities. Capacity-building in space law will help train space lawyers, help countries strengthen national space legislation, fulfill obligations under international law, and implement international space law instruments. Thus recently capacity-building in space law received the attention from COPUOS, and since 2008 capacity-building in space law is one of the topics of the COPUOS Legal Subcommittee. Therefore, it is necessary to establish an APCSL in the Asia Pacific region to develop the extension of space law and to promote capacity-building in space law.

B. Feasibility

The establishment and operation of APSCO have laid a solid institutional support for the establishment of APCSL.⁹ As an International Space Cooperation Organization, APSCO needs an institution like APCSL, and has the ability to support it through its budget. Currently, there are several organizations are fruitful in the fields of space law teaching, research, training and promotion, such as the International Institute of Space Law and ECSL, and they are all established under the frameworks of related institutions. International Institute of Space Law was established in 1950 and developed under the framework of the International Astronautical Federation, and ECSL in 1979 with the support of ESA. Among them, the establishment and development experience of ECSL has a particular inspiration for APCSL, as the two have similar background and similar framework. The establishment and development of APSCO had received a lot of inspiration from ESA, so it is also natural for the establishment of its Center for Space Law to learn from the mature ECSL.

By the appeal of scholars and the force of Mr. Ahmad Talebzadeh, Director General of the Department of External Relations and Legal Affairs of APSCO,¹⁰ the establishment of APCSL has got the political support from members states, and after further research and discussion, it will be truly established at legal level. Therefore, with its feasibility confirmed, the next step is to propose a scientific program for its construction and development, in order to promote the establishment and operation of the Center. To this end an international conference which will be held in July 2011 at Harbin, which will study the issue in-depth.

III. SOME IDEAS ABOUT THE ESTABLISHMENT OF APCSL

A. Drawing on the Successful Experience of ECSL for Innovation

As ESA brought a lot of inspiration to the establishment of APSCO, ECSL will also provide a good model to the establishment and development of the Asia-Pacific Center for Space Law. ECSL is a flexible and open structure, and its purpose is to

⁹ Zhao, "APSCO Convention", *supra* note 6 at 3-13.

¹⁰ Mr. Ahmad Talebzadeh is also the current Chairman of the UN-COPUOS Legal Subcommittee.

provide a forum for Europeans working on space law. What is ECSL? According to Sergio Marchisio, the Chairman of ECSL:

the Center is not a law faculty or an Institute of law or political science studies, nor an establishment in which students can follow courses and obtain qualifications. Notwithstanding, it is an important institutions working in the sector of space law educational programs at the European level.¹¹

Its Board, which is elected for a period of two years, leads the work of the Center. To that end, a General Meeting is held every two years. Since its establishment on May 12, 1989, ECSL has been operating for 23 years, and the organization is increasingly maturing, its activities growing, its influence increasingly expanding. It promotes space law teaching and research in Europe, and also expands the influence of space law in Europe, so its experience is worth learning.

Similarly, the APCSL would be neither a law faculty nor an institute of law, but an institution which basis its actions on promoting the extension, education and training of space law in the Asia-Pacific region. On the one hand, the future APCSL will draw on the experience of ECSL, and gradually establish and improve its organization, mechanisms and activities, but on the other hand it will need to innovate according to the characteristics and experience of APSCO, and the actual situation of the Asia-Pacific region. For example, under the framework of the Center, and with the help of the University, it can consider setting up a Master of Space Law program, and if this idea can be successful, it will be an innovation of the APCSL. If APCSL intervenes in the establishment of the Master projects, it can select students from the Member States of APSCO based on its needs, so as to promote the education of space law students with plans.

B. The Legal Basis of APCSL

APCSL should be organized as ECSL, it should be established by APSCO and its budget is mainly from APSCO. It is not an institution of APSCO, but when necessary, APSCO can provide legal personality to support the Center. The members of APCSL should be natural and legal persons from the APSCO Member States or Associate States. As long as they comply with Statute of the Center and are interested in the development of space law, they can apply to become the members. The governing body should be a Board with no more than 10 people. Decisions will be taken at the annual General Meeting, but will establish a Secretariat to maintain a permanent presence. The Secretariat should be set up within the APSCO headquarters.

APCSL should also conclude a statute,¹² so as to regulate the major matters of APCSL. It should include provisions on, *inter alia*, the establishment, membership, purposes, resources, services, organs (General Meeting, the Board, and the Secretariat), finance and external relations of the Center, as well as provisions on amending the statute.

¹¹ Sergio Marchisio, “The Educational Programme of the European Center for Space Law” in *Proceedings of the United Nations/International Institute of Air and Space Law Workshop on Capacity Building in Space Law* (2005) at 155 [Marchisio, “ECSL”].

¹² European Centre for Space Law Charter is formed by 9 articles, amended in 2001 and 2005, and provides important matters of the Centre.

C. *The Main Purposes of the APCSL*

APCSL should be an institution whose mission is to promote space law education and training at the Asia-Pacific regional level. As with the ECSL, the purposes of the Asia-Pacific Center for Space Law should also be to let people concerned with space law get together and, meanwhile, to strengthen the existing power of space law, and to provide assistance for the implementation of APSCO projects.¹³

Of course, in addition, the Center should also strive for creating something new within the region. The Center should be developed to support and sustain the following functions: (1) to promote space law teaching and research of Member States; (2) to promote the information exchange of space law and policy among Member States; (3) to educate and train professional and non-professional space law staff, and should try to establish Master of Space Law Program, taught in English, which remains open to students from its members states; and (4) as a think tank in Asia, to provide recommendations to the United Nations, and to improve space law-making and the implementation of international space legal obligations in Asia.

D. *The Main Activities of APCSL*

Currently, there are six main activities envisaged for APCSL. The first is the Master of Space Law program taught in English. Today, some famous universities like McGill University in Canada, Leiden University in the Netherlands, and University of Paris XI in France have set up master's programs related to space law. These programs are not solely dedicated to space law: some refer to air law and space law, while others address telecommunications and space law. Nevertheless, the establishment and development of these projects play an important role in the extension and research of space law.

Several years ago I have been looking forward to establishing a Master of Space Law project.¹⁴ To that end, I proposed that:

the comprehensive teaching and research of Outer Space Law, especially the comprehensive research of space public and private law, is an important method to broaden the space law research field. The Master of Space Law courses can cover all areas of space public and private law, and are at international, regional and national law levels, and emphasize the combination of theory and practice.¹⁵

The ACSL provides a forum to introduce such a program.

Second, the ACSL should run a summer school on space law and policy. This course would be organized once a year for two-weeks, and can be organized by the APCSL in cooperation with Universities of APSCO members. The program should be mobile, with different Universities of different Member States organizing the program each year. The participants should be students from Member States, and most of them should be familiar with international law, be proficient in English and interested in space law. The teachers would be Professors, officers from relevant space organizations and legal professionals from Member States or non-Member States.

¹³ Marchisio, "ECSL", *supra* note 11.

¹⁴ Haifeng Zhao, "The Status and Prospects of Chinese Space Law Teaching and Research" (2006) I Space L. Rev. at 46.

¹⁵ *Ibid.*

The third program would be a practitioners' forum. This is also a successful program at the ECSL. It is also very necessary for the legal advisers, lawyers and other relevant practitioners of space industry to exchange information and ideas so as to promote space law and legal research. This forum can be held every year, one-day each time, and it can be non-academic style, focusing on the exchange of developments related to space law and the communication between peers with different professional backgrounds.

The fourth program envisaged is an academic seminar. It can organize space law and policy seminars. In order to promote the study of space law issues, when necessary it can be jointly held, including with non-Member States. The content of the Seminar can refer to the framework and development of international space law, can be concerned with the development and improvement of the APSCO legal framework and the legal issues about APSCO,¹⁶ and also can focus on the implementation of international space law and the promotion of national legislation. In short, the content can be very rich. Or, as with ECSL, it can cooperate with the relevant institutions to hold space law-related seminars under the framework of the United Nations COPUOS Legal Subcommittee.

A fifth program would involve publishing space law-related materials. APCSL shall publish newsletters, in order to inform the space law-related topics and the organizational activities to members. The proceedings of the above Forum and Seminar should be published too. Furthermore, it should publish annual reports and issue them at the General Meeting to summarize the work of the year as well as to envisage the work of the coming year.

A sixth final program might be hosting the Mandred Lachs Space Law Moot Court Competition. If the Asia-Pacific Center for Space Law can organize and support the Asia-Pacific Mandred Lachs Space Law Moot Court Competition, it will be a very pleasant thing. However, in view of the present limitations of Member States and the restraint of language, it can not be come true right now.

E. The Relationship between the APCSL and the Member States of APSCO

At the beginning of its establishment, ECSL tried to avoid establishing a too formal or over-centralized structure, but tried to establish a flexible organization to be helpful to the communication and coordination, which may be a reason for its success.¹⁷ One successful experience of ECSL is the establishment of National Points of Contact (NPOCs), which are located in Member States and become the bridges between Members and the organs of ECSL in Paris. At the beginning of its establishment, ECSL applied itself to promoting the establishment and development of national centers for space law, and gave them technology and other proposals in order to establish a European network. It is also a good way to encourage members to directly communicate with the Center.

This experience is also a good point of reference for APCSL. The functions of the future NPOCs of Asia-Pacific Center for Space Law is to contact Members, to serve as the bridge between members and the Center, and to facilitate the dissemination of information. Meanwhile, according to the purposes of the APCSL, the International Points of Contact can also organize their own activities, such as organizing seminars, training courses and thematic studies. These Points will become

¹⁶ For example, the relationship between APSCO and the UN five space treaties and relevant principles of the General Assembly.

¹⁷ Marchisio, "ECSL", *supra* note 11 at 158.

an important part of the APCSL.

F. The Budget and Other Issues

The same as ECSL, the main budgets of the APCSL should be borne by APSCO. These budgets will be used for running costs, including a permanent Secretary-General's salary, activities costs, printing and publishing costs. The Center would also welcome the contributions from space-related organizations and enterprises. Meanwhile, for a certain period, it should charge some membership fee.

For many reasons, the Center should be located in the headquarters of APSCO. The APSCO representative will also automatically become a member of the future Board

G. The Relationship between APCSL and Non-Member States of APSCO

APCSL will maintain close cooperative relations with the UN COPUOS Legal Subcommittee, ECSL and the various space law institutions of its Member States. At the same time, it will establish and maintain cooperative relations with space law institutions of Asia-Pacific non-Member States. When necessary, they can work together for some specific ends, such as jointly organize seminars and training courses. Many activities of the Center can also permit the staff of non-Member States to attend, such as the teachers of teaching or training activities, and the Master of Space Law classes also can receive students from non-Member States, so as to promote space law to spread in the Asia-Pacific region and to promote common progress of space law research.

IV. CONCLUSION

The position of an APCSL within the Asia-Pacific region is easy to foresee. We have reasons to believe that with the continuous expansion of its activities, the Center will play its different functions at different levels: at the Asia-Pacific level, it will promote regional capacity-building in space law, promote the improvement of APSCO law, improve the level of APSCO internal governance, and clarify the related legal issues in the space activities of APSCO; at Member State level, it will train a competent space law staff for each country, will improve national capacity in space law teaching and research, and develop national legislation and learn from each other; at the international level, it will promote the spread and implementation of international space law, and as a regional center it will join in the activities of the United Nations COPUOS Legal Subcommittee, putting forward constructive ideas and suggestions in order to improve the APSCO's image. Of course, these all need long-term efforts and effective work after the establishment of APCSL.

AN ASIAN CENTER FOR SPACE LAW: THE WAY FORWARD FOR PROMOTING AWARENESS OF SPACE LAW IN ASIA

Yun Zhao

Abstract: The role of space law research and education plays an important role in promoting cooperation and understanding between nations as well as knowledge sharing between persons. While states and institutions have formed strong, coherent networks such as the European Center for Space Law, Asia-Pacific has yet to create such a body. This is an altogether undesirable situation. Using the ECSL as a model, this paper analyzes the potential for creating an Asia-Pacific Space Law Center. It does so by exploring two options: either by creating an autonomous organization or by attaching the center to an existing regional organization. While the former may be more desirable, the latter appears more plausible in the near future and should be positively considered.

I. INTRODUCTION

The United Nations (UN) attaches great importance to the promotion of space law. In the last few years, the UN has taken the initiative to further the understanding of space law around the world.¹ A series of workshops have been organized in different continents to promote the awareness of space law.² Such workshops can to a certain extent draw attention from the States to the space treaties and space laws in general as the governments will normally send delegates to attend such workshops; however, these one-week workshops can only serve a limited purpose, a sustainable framework is needed at local or regional level to further strengthen the promotion of space law.

The European region has already had its own space law center and various activities have been organized to promote space law in the region. In the American region, in-depth research and space law education has already been in place in the United States and Canada. However, this is not the case in the Asia-Pacific region. Space law remains a mysterious area of law for most people in the region, even for many lawyers.

This article takes up the initiative to examine the necessity and feasibility of setting up a space law institution in the Asia-Pacific region. Part 2 gives an overview of the current space organizations in the Asia-Pacific region and brings forward the fact of lacking an institution in promoting space law in the region. Following the model of the European Center for Space Law, Part 3 proposes the establishment of an Asia-Pacific Space Law Center (APSLC), which shall take up the important task in promoting the awareness of space law in the region. In view of the rapid development of space technology and its intimate connections with our daily life, the article

· Associate Professor, Faculty of Law, The University of Hong Kong. PhD, Erasmus University Rotterdam, the Netherlands; LLM, Leiden University, the Netherlands; LLM, LLB, China University of Political Science and Law, Beijing.

¹ *The Space Millennium: Vienna Declaration on Space and Human Development* (Declaration of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space, Vienna, 19-30 July 1999), online: <<http://www.oosa.unvienna.org/pdf/reports/unispace/viennadecle.pdf>>.

² United Nations Office for Outer Space Affairs, "United Nations Workshops on Space Law", online: <<http://www.oosa.unvienna.org/oosa/en/SpaceLaw/workshops/index.html>>.

concludes that a regional academic institution is vital to the promotion of research and education in space law in the region. Better understanding of space law shall be conducive to the formulation of an appropriate legal regime for space activities, which shall in turn provide an impetus for future development of space activities.

II. CURRENT SITUATION IN THE ASIA-PACIFIC REGION

The Asia-Pacific region leads major economic and social developments in the last few decades. Along with the rapid economic development, the Asia-Pacific region stands out as one of the most vigorous and promising regions for the aerospace industry. The need to set up some kind of cooperative framework has been well recognized, which can be well exemplified by the establishment of several regional space organizations already in the Asia-Pacific region.

It would be useful to look into their major functions to decide on whether promotion of space law has been well covered by the current organizations. So far, three important regional space organizations are in place to deal with different aspects of space activities in the region: Asia-Pacific Regional Space Agency Forum (APRSAF), Center for Space Science and Technology Education in Asia and the Pacific (CSSTEAP), and Asia-Pacific Space Cooperation Organization (APSCO).

The CSSTEAP is, strictly speaking, a UN organ to promote the development and use of space technologies in developing countries. It is only one of several branches in the world to serve the purpose of the UN resolution. Thus, the Japanese-sponsored APRSAF and the China-led APSCO, as the two major regional camps in the Asia-Pacific region, have been seen as “two rival space organizations, each seeking to ‘organize’ Asia’s space powers and their cooperative activities.”³ As a result, one scholar correctly observed that “trends in Asian space cooperation show considerable fragmentation.”⁴

While space technologies and activities have a high level of sensitivity, space law could well be one neutral area of common interest to the Asia-Pacific society. By carrying out space law-related education, training and research, the countries in the Asia-Pacific region can keep on a par with other regions in the world with high-quality education and research. With sufficient common understanding of space laws and principles, the countries can formulate their own national space laws to provide their own national space programs. Such cooperation can also provide a basis for these countries to work together to resolve some seemingly sensitive issues in a neutral and academic manner.

III. INSTITUTIONAL CAPACITY BUILDING FOR SPACE LAW PROMOTION IN THE REGION

Discussions above show that space law cooperation, not having been covered by the existing regional organizations, is one field needing immediate attention from the countries in the region. The two other major regions, namely, Europe and America, have been well advanced in the education and research of space law. Europe, consisting of many geographically small countries, has been able to set up an organization, the European Center for Space Law (ECSL), in 1989 to take up the important task of space law promotion and cooperation. The achievements have been well recognized within the space law circle. With large numbers of nations in the

³ James Clay Moltz, “China, the US and Prospects for Asian Space Cooperation” (2011) 20 J. of Contemp. China 68 at 77.

⁴ Moltz, *supra* note, at 78.

Asia-Pacific region, it would be advisable to have a similar body in place to take over the task in the region.

Then, the question is how to set up this body. One easy approach is to use one of the existing regional organizations as a basis and extend its functions to cover space law promotion. Indeed we have recently noted the intention of the APSCO to establish a Research Center for Space Law & Policy in the APSCO headquarters and develop some branches in Member States.⁵ This issue will be further discussed in its Space Law Forum to be held in Harbin, China in July 2011. It would be interesting to keep a close eye on this new development.

It is commendable to see that some efforts are being made by the APSCO. At least we have an existing body to take over the task of space law promotion, which can largely save the time and energy to start everything anew. We should thus keep a close look at the new trend. The APSCO can fill in this gap in the region and take up a role in space law promotion, whose influence can never be overlooked.

We must, however, note the fact that the APSCO has now only seven members; some important countries in the region, such as Japan and Korea, are still outside this forum. This can be a fatal element to the purpose of space law promotion in the region. The same problems exist with the other two organizations. Furthermore, technical cooperation can be quite different from cooperation in the promotion of space law. We will need to have a neutral platform so that States in the region will be willing to become part of it. This is what the existing organizations cannot achieve.

In order to secure the participation and cooperation from as many members as possible in the region, it would be advisable to have a separate and independent organization in charge of space law promotion, insulated from the sensitive area of space technologies and their applications. The pure academic nature of space law and the proposed body can to a large extent dissipate concerns and dubious attitudes from the countries in the region. The nature of a neutral body, purely focusing on academic purpose shall add to the willingness from the countries in the region and success results in the end.

Following the European model, a similar name to the ECSL, Asia-Pacific Space Law Center (APSLC), could be adopted, which can show the counterpart in the region in the same area. The ECSL was established at the initiative of the ESA and thus the membership was restricted to natural and legal persons from ESA Member States, Associate States and other European States having concluded a Cooperation Agreement with the ESA and who are interested in the development of space law and who accept the ECSL Charter.⁶ Different from the ECSL, future APSLC shall be open to natural and legal persons in the region who are interested in space law and accept the APSLC constitutional documents.

It is important to make sure that the APSLC is financially viable in the first place. In this regard, the support of the countries in the region shall be essential. This is even more important for the initial startup of the Center. In the long run, the Center is expected to be financially independent and viable. Members are expected to pay an annual membership fee. Sales revenues from the publications of the Center from the symposia and conferences can be another channel; annual training programs shall be

⁵ Asia-Pacific Space Cooperation Organization, "First Announcement: APSCO Space Law Forum", online: [APSCO <http://www.apsco.int/First%20Announcement%20on%20APSCO%20Space%20Law%20Forum.pdf>](http://www.apsco.int/First%20Announcement%20on%20APSCO%20Space%20Law%20Forum.pdf)

⁶ European Centre for Space Law, "ECSL Charter", online: [APSCO <http://www.esa.int/SPECIALS/ECSL/SEMNCVGHZTD_0.html>](http://www.esa.int/SPECIALS/ECSL/SEMNCVGHZTD_0.html).

another important financial source for the center.

The objectives of the APSLC can be adapted from the ECSL model as follows:

1. to exploit and complement the efforts made and the resources available in the region in the field of space-law research;
2. to promote knowledge of and interest in the law relating to space activities;
3. to provide for exchanges, including through the organization of colloquia and other meetings, of information and ideas across disciplinary and national lines;
4. to identify themes related to space law in which university research and training at degree, doctoral and post-doctoral level should be encouraged;
5. to identify areas of space-related activity in which regulation is appropriate, and to discuss and propose principles and draft norms which may then be promoted at national or regional level;
6. to promote the establishment and development of national centers for space law research and to assist them by providing them with access to research resources throughout the region, and by giving them technical and other advice.⁷

As such, the APSLC shall coordinate the space law education and research, facilitate the exchange of national space laws and policies, and disseminate knowledge of space law within the region. It would further function as one important contact point for inter-regional space law cooperation. In line with the above adapted objectives, the APSLC can organize important annual events, symposia, workshops, conferences and training courses as normal means of disseminating knowledge of space law in the region. However, the ASCL could also be one ideal body in charge of the Asia-Pacific round of Manfred Lachs Space Law Moot Court Competition.

The APSLC shall also promote space law research. An Expert Team should be set up to conduct research projects on various space law issues facing the region in recent years, such as climate change and disaster management.

When it comes to internal structure, similar to that of the ECSL, the APSLC shall have a General Assembly, which shall be open to all the APSLC members and meet every two years. This body shall be the organ of power, making decisions on strategic issues of the APSLC, such as members for the APSLC management team, budget and financial contributions.

The APSLC Board shall be the management team for the Center; it shall be responsible for the management of the Center, the execution of the projects and the attainment of the objectives of the Center. The Board members shall be elected for a term of three years by the General Assembly. The Board shall have its Chairman, Vice Chairman or Chairmen and several senior members. A secretariat shall be set up for daily management and promotion of Center's activities.

When it comes to the headquarters of the APSLC, it would once again be important to find a neutral and relatively convenient place, which can be acceptable to most Asia-Pacific countries. The members shall not have much difficulty in finding such an ideal place in the Asia-Pacific, a culturally and geographically rich region in the world.

One final point which we must keep in mind is that the establishment of the

⁷ European Centre for Space Law, "Home", online<: <http://www.esa.int/SPECIALS/ECSL/>>.

APSLC, while seen more as an academic event, shall get the full support and recognition of the governments in the region. While the neutral and academic nature is important to the success of the Center, without the support and recognition from the governments, the APSLC will encounter various difficulties and possibly never come to reality; even if established, it will not achieve the results and success it expected. As one scholar has correctly stated, the political drive, at the highest level, is necessary not only to set up the organization, but also during its subsequent period.⁸

It would thus be important to build consensus in the first place among academics, scientists, high-ranking officials from the Asia-Pacific countries on the establishment of the APSLC. In this regard, the APSCO, with strong governmental support, appears to be again a good starting point to serve as the forerunner for space law cooperation in the region. With an initial smooth start as a research center under the APSCO, it could slowly revert to an independent body after obtaining sufficient support; through the years, the Center can develop into a real space law center for the region. Thus, the author firmly believes that the APSCO's space law research center initiative is the second best approach to the APSLC.

Pragmatically speaking, the APSCO's initiative is much easier to be put into practice. With solid foundation and financial support, the space law research center can be well set up and positioned in the current framework of the APSCO. The research and the APSCO can be mutually beneficial. Similar to the ECSL, the center's membership shall go beyond natural and legal persons from the APSCO Member States. As stated in the APSCO's constitutional document, any State Member of the UN or any international organization involved in space activities may be granted the Observer's status; a state outside the region and the member of the UN may apply for granting the status of the Associate Member.⁹ As such, the center's membership can include natural and legal persons from Observers, Associate Members and any other countries which have a cooperation agreement with the APSCO. In this way, the cooperation in the space law area can break through the limits of the APSCO and consequently bring as many members in the region as possible within its mandate. The structure and activities of this research center can adopt similar model as discussed above for the APSLC.

IV. CONCLUSION

Space technologies, such as telecommunications and broadcasting, have brought great change to our world, and make our life more colorful and more convenient. On the one hand, such "advanced technologies, because of their huge costs, large scale, and, in the case of nuclear weapons, immense destructive power provide an important impetus to international cooperation."¹⁰ On the other hand, cooperation in the research and development of space technologies has further facilitated these changes and makes them develop at an ever-increasing pace. The importance of space law in maintaining space order and realizing the utmost goal of peaceful uses of outer space

⁸ Simone Courteix, "Towards a World Space Organization?" in Gabriel Lafferandierie, *Outlook on Space Law over the Next 30 Years, Essays Published for the 30th Anniversary of the Outer Space Treaty* (The Hague & Boston: Kluwer Law International, 1997) 423 at 427.

⁹ *Convention of the Asia-Pacific Space Cooperation Organization, done at Beijing*, 28 October 2005, art. 9.

¹⁰ Victor Basiuk, *Technology, World Politics, and American Policy* (New York: Columbia University Press, 1977) at 7.

has been widely acknowledged.¹¹ Internationally, the UN Committee on the Peaceful Use of Outer Space (UNCOPUOS) plays the important role in the space law promotion. The ECSL was set up in 1989 to take over the task. However, the Asia-Pacific region has lagged far behind in the area.

The existence of the three space organizations in the Asia-Pacific region demonstrates the clear intention in the region to cooperate in the space technologies area. However, such cooperation faces severe challenges due to various factors, such as the cultural and historical differences among the Asia-Pacific countries and the sensitive nature of space technologies. Space law, one relatively neutral subject, could be one best area to advance space cooperation in the region to a higher level. It is good to see that the APSCO has already had the idea of setting up a section in charge of space law cooperation. While there are no better initiatives, this can be taken as the best starting point for the time being and serve as a transitional mechanism for space law cooperation in the region.

In the long run, it would be advisable to have a separate body, such as the proposed APSLC in this article, to take over the task. We need to focus on the academic nature of space law cooperation; the neutrality and independence of the framework for space law cooperation can serve as impetus for members in the region to be part of the cooperative body and realize the goal of promoting space law in the region.

¹¹ See e.g. David Tan, "Towards a New Regime for the Protection of Outer Space as the "Province of All Mankind"" (2000) 25 *Yale J. of Int'l L.* 157.

SESSION 3: SATELLITE APPLICATIONS FOR THE BETTERMENT OF
HUMANITY

LEGAL ISSUES OF COMMERCIAL REMOTE SENSING

Mr. K.R. Sridhara Murthi

Abstract: The changing technological landscape of society in developing and processing space-based information has developed at an extremely rapid pace. This can be seen in the evolution of satellite remote sensing as an increasingly viable commercial activity. Indeed, as space- and internet-based technologies continue to evolve and increase in accessibility, their ability to be used for innovative purposes in the private sector has grown many times over and also result in a convergence between military and civilian technology. This paper looks at the legal aspects of commercial remote sensing. It argues that developments in satellite applications and internet-based technology have created multiple new uses for such data. In particular geographic information systems will increasingly develop as an elaborate and accessible part of human society. These developments require us to think critically about our current position, with a view to ensuring that the principles governing our conduct continue to reflect and effectively regulate technological reality.

I. GLOBAL PICTURE OF COMMERCIAL REMOTE SENSING

Commercial activities in the field of space based earth observations had their beginnings with the marketing and distribution of data and a few downstream services, making use of public funded satellite systems. Landsat, SPOT, Radarsat programs followed by IRS were the forerunners in support of these activities. A step forward was the policy initiative for private ownership of earth observation satellites. This was triggered by Land Remote Sensing Act enacted in 1992 in the USA, allowing for licensing of domestic, privately owned remote sensing systems. A Presidential Decision Directive in 1994 further loosened the restrictions on the sale of imageries to foreign entities, and about a dozen companies in the US received licences for operating commercial remote sensing systems.

What the world saw in the following decade was a new trend. Beginning with Space Imaging's Ikonos satellite (capable of providing images of about 1 meter resolution) in 1999, a number of commercially owned systems and those with public private partnership have emerged. Digital Globe's Quick Bird series, Rapid Eye constellation, EROS series, Terra SAR X, COSMO-SkyMed, and small satellite constellation promoted by Surrey Satellite Technologies are some examples of that new trend. These have augmented the commercial operations of traditional players in global markets including RADARSAT, SPOT and IRS who commercially marketed data and downlinks through space systems established by public funding. It is noteworthy that there is a trend for transitioning the public funded systems into private ownership as seen in case of SPOT. This transition to private ownership from that of government seems to be a slow process, considering that out of about 200 satellites which are forecasted to be launched during the next decade most of them will be funded through governments. One could expect that some of them will be dual-use systems, serving both governmental use as well as commercial markets. This

Senior Expert, Office of the Advisor to the PM, Public Information Infrastructure and Innovation, India. The author may be contacted at krsmurthi09@gmail.com. The views expressed in the article by the author are his own and do not represent that of the organization with which he is associated.

structure is a consequence of the recognition of public good role of earth observation data while simultaneously its commercial potential is also evident.

The global demand for earth observation data from space has also been steadily growing. The major drivers of this growth are security applications, environment monitoring, climate change, agriculture and disaster management support. Governments all over the world have been supporting the development of instruments suitable to be flown on satellite platforms for measurements over land, seas and atmosphere. The Committee on Earth Observation Satellites (CEOS) has compiled a catalogue of 400 instruments that are or will be deployed through the satellite programmes of its space agency members during 2010 to 2025.¹ These investments augur well for bringing new applications besides widely spreading the already proven applications from remote sensing systems, with attendant commercial spin offs.

Major users of remote sensing data are still the government agencies as seen from the fact that more than half of revenues for satellite data springs from the government agencies. In the changing geopolitical scenario, the needs of emerging economies, challenges of terrorism and security concerns in the globalised era have all triggered a spurt in the demand for remote sensing data. Multiple factors such as entry of new players, international dimensions of earth observations commerce and growth of markets for satellite data and applications into a multibillion dollar value annually, dictate the need for a legal environment conducive of commercial applications.

II. TECHNOLOGY ADVANCES AND GROWTH IN APPLICATIONS

One of the important facets of environmental changes touched upon in the foregoing section is the change in the technology landscape, bringing along with it a quantum jump in applications capabilities. Commercial satellite systems are already providing images with sub-meter resolutions and the difference between the military and civilian systems has become narrower in terms of capabilities. The advances in computational technologies, particularly the availability of high end computers at lower costs, novel networking architectures, inexpensive positioning solutions, the spread of web-based technologies, developments in new software tools, mobile-based applications and advances in modelling have all contributed to very significant enhancement of applications of satellite remote sensing. The space-based data empowered with these advances in technologies have created a new dimension to the spatial visualisation of information. The internet has also brought a paradigm shift in information access policies. Users could have access to web-based earth observation data or they can link to myriad databases and share them on a global scale, overcoming the barriers of national boundaries. Advanced sensor technologies are now more freely available for civilians and for commercial use. Data from civilian and commercial satellites are made use of in military applications, thinning the distinction between civilian and military systems.

The other major technology that has changed the scenario is the Geographic Information System (GIS) –which enables handling, analysis and representation of all forms of spatially referenced data or information. Combined use of several technologies in GIS allows for the powerful integration of various maps and attributes datasets to create newer visualizations of information and provide timely support for

¹ See CEOS, “The Earth Observation Handbook”, online: <http://www.eohandbook.com/>.

decision making. Increasingly, GIS has become the key component of information management and decision support systems at various levels ranging from a national level to an individual enterprise. The application of GIS spans a whole range of economic, social and governance functions. Thus, its relevance extends across the entities of government, citizens and business enterprises.

The third major technology that is emerging is the precise positioning and navigation datasets through satellites that use radio ranging to fix precisely the position of an object. The high precision of position coupled with the ease of availability of this GI dataset makes it a major input for a variety of aviation navigation and personalized navigation systems.

The range of new applications unfolded by the improved quality of remote sensing data covers a wide spectrum of areas such as facility management, real estate transactions, monitoring taxation, land use planning, precision agriculture, location of ground water and water management, transportation, emergency services, environmental impact assessment and research. Convergence of various technologies are driving the establishment of national spatial data infrastructures – which are interlinked databases, catering to a variety of information needs for users in government and the public domain, providing user friendly access. The impacts and benefits of such activities in developing countries could be very significant. Being amenable for access by internet, satellite imagery is tending to be fully integrated into global information networks.

III. EVOLUTIONARY TRENDS IN COMMERCIAL ACTIVITIES

Globally commercial activities in fields relating to remote sensing are organised in several layers as shown in the following table (see Table 1). The relevant broad legal issues for these various layers are also indicated. In general, data/technology availability for high resolution systems of 1 meter resolution or better is subject to greater control by the governments of countries who possess them.

Table 1: Layers of Global Commercial Activity

Nature of activity	Domain/ Scope	Relevant legal issues
Commercial manufacture of satellites	Markets extend internationally	Licensing for export of technology (Domestic laws of supplying country) Bilateral arrangements between Supplying and recipient nations
Ground reception, tasking stations, data processing hardware and software	International markets. Standard equipment for satellite data reception and recording are freely available in commercial markets.	Contract and export trade laws, IPR protection policies, Bilateral cooperative agreements and in some cases specific technology export regulations.
Resale of data	Foreign nations, territory specified	IPR protection, contract laws

Downlink marketing	International markets	Domestic regulations embedding national security and foreign policy interests
Applications undertaken as commercial projects	Domestic or international markets	Thematic applications generally have no restrictions. Contract law, regulations regarding service exports apply

Apart from the trend of government programs seeking some returns on investment through commercial sale of data as seen in the cases of COSMO-Skymed, IRS, SPOT, or Korean systems, another major trend that the commercial market is likely to witness in future years is the emergence of a few large players who will integrate value chains as seen in cases such as SPOT-INFOTERRA and RADARSAT-MDA. Key to the commercial growth of data and services are access policies for data in different countries, which are different and are not harmonised.

IV. LEGAL FOUNDATIONS

The fundamental principles on space-based remote sensing that govern activities of states or the persons/entities under their jurisdiction are derived from the framework of UN treaties related to Exploration and Peaceful Uses of Outer Space in general and the Resolution 45/61 on Principles relating to Remote Sensing of Earth from Space, adopted by the UN General Assembly in 1986 in particular. These principles essentially reiterated the “open skies” policy and required no prior consent of the sensed country for imaging from space. The Resolution also stipulated that remote sensing activities from space shall not be conducted in a manner detrimental to the legitimate rights and interests of the sensed state. It had also bestowed the right of non-discriminatory access by the sensed state, for data concerning its territory. Thus these principles represented a delicate balance between group of countries who advocated open skies and the others who shared concern of infringement of their sovereign rights in imaging over their territories without prior consent and distributing such data to third countries even while they had no guaranteed access to such data as sensed states. These principles encouraged the promotion of international cooperation in the conduct of remote sensing activities, with due regard for the needs of developing countries. The UN Principles enjoyed a wide acceptance although they were not legally binding. Indeed, they formed the basis for several international agreements between providers of remote sensing data and the recipients over the subsequent years.

Resolution 41/65 did not address several issues in sufficient detail or clarity that become important in the context of commercial activities. For example protection of intellectual property rights (IPR) to the data and the possible liabilities that may arise when the data is used improperly or when it is incorrectly interpreted are not addressed. In practical terms, there is uncertainty as to the application of these guidelines at an international level. The UN legal framework did not envisage a high degree of private commercial activities in space, hence creating the need for appropriate national legislation to control and monitor private activities in space. Issues relating to possible infringement to individual privacy were not conceived or addressed although now it is a real possibility. The unilateral approach involved in

national legislation has resulted in divergent data policies among states. In view of the lack of international coordination, access policies are still restrictive. There are several terms in the UN Principles which are not sufficiently defined. An example is the principle of reasonable costs for the data. Also the question of third party risks is not addressed. In view of transboundary processes involved in conversion and use of data, IPR questions could become complex to handle if not properly defined. In order to resolve these complex issues, a harmonised set of regulatory principles at international level is called for. Coordination efforts under a broad multilateral forum are necessary for evolving an overarching legal framework.

Though the UN Principles have come to be accepted as part of customary law, the evolutionary trends in the use of remote sensing technologies and policies, including commercialisation, point to the need for new developments in legal aspects. For instance, during 2004 Berlin Conference of International Law Association's Space Law Committee, the chairman Professor Maureen Williams in his conclusions drew attention to the fact that remote sensing technologies are today a commercial activity par excellence, and that space activities carried out by private entities are unrelentingly growing, it appears appropriate to begin the drafting of guidelines to cover certain gaps in the UN Principles and provide interpretation criteria to shed light on some of the general principles. He *inter alia* had also concluded that a realistic course of action would be the enactment of domestic law on remote sensing coupled with a revision by governmental bodies and private institutions of the most controversial and/or incomplete aspects of the UN Principles. Domestic legislation should address, in the first stage, issues relating to the protection and distribution of data and licensing procedures, with a view to giving greater transparency to remote sensing activities.

With the advent of high resolution systems in the commercial domain and the wider availability of data from such satellites, as well as greater transparency and connectivity being triggered by the internet, data policies for space-based remote sensing have been undergoing a change in different parts of the globe. In some countries, they are still being debated. In the USA, superseding the earlier Presidential Decision Directive 23, a new national policy was declared on April 25, 2003, establishing guidance and implementation actions for commercial remote sensing space capabilities. In particular this policy aimed at the following:

- Relying to the maximum practical extent on U.S. commercial remote sensing space capabilities for filling imagery and geospatial needs for military, intelligence, foreign policy, homeland security, and civil users;
- Focusing United States Government remote sensing space systems on meeting needs that cannot be effectively, affordably, and reliably satisfied by commercial providers because of economic factors, civil mission needs, national security concerns, or foreign policy concerns;
- Developing a long-term, sustainable relationship between the United States Government and the U.S. commercial remote sensing space industry;
- Providing a timely and responsive regulatory environment for licensing the operations and exports of commercial remote sensing space systems; and
- Enabling U.S. industry to compete successfully as a provider of remote sensing space capabilities for foreign governments and foreign commercial

users, while ensuring appropriate measures are implemented to protect national security and foreign policy.²

Indian data policy, on the other hand, recognises the need for continued investments in satellite remote sensing for the public good, and stipulates organisational arrangements for the dissemination of data from Indian remote sensing satellites for Indian and foreign users. To address issues of security, data requirements beyond specified resolution are scrutinised for users in India, whether the data is sourced from an Indian or foreign satellite. In tune with changes in the environment, there are ongoing efforts to update this policy framework

A global survey of the Land Remote Sensing Laws and Policies of National Governments prepared by Professor Joanne Irene Gabrynowicz of the National Center for Remote Sensing, Air, and Space Law at the University Of Mississippi School Of Law for the U.S. Department of Commerce/ NOAA summarises the diversity and trends in the policy and legal environment. The widespread conflict between withholding data for national security purposes and making data available to increase its use, thereby demonstrating its economic and social value is fairly evident. The report also highlights the trend of commercial high-resolution remote sensing increasingly being organized and institutionalized through law and policy to meet national security concerns. This is also evidenced through the changing data distribution policies. Practical issues raised by commercial remote sensing activities have in a way become drivers of national space laws.

Given the unimpeded observations and global distribution of data gathered from space over the years, particularly in the high resolution range, through commercial channels and through the internet, policies adopted by space faring nations such as “shutter control” to further their national security or foreign policy interests had not posed major problems. However, there is requirement of extra territorial application of domestic law in some of those regulations, which has inherent conflict potential. Each country may follow its own regulations and there could be conflicts of interests, to the detriment of the healthy development of the commercial sector. Moreover, common global needs such as monitoring and protecting the global environment, tracking illicit activities, promoting public health and responding to natural disasters can be satisfied only with a broader international understanding and consensus. Pending development of such common norms, states could develop means to live with the new era. They would negotiate with satellite operators’ conditions to satisfy their concerns, as they provide access to their markets.

Hence a solution to overcome this problem is to develop an understanding in a multilateral framework. The UN Principles could be further reviewed taking into account the new challenges of this era and with an aim to evolve legal principles for orderly development of commerce in this field, respecting the right of governments to receive certain information from commercial entities when their territories are imaged. The review could also aim at evolving criteria for access by sensed states, to data and information over their territories and ensure a system for information flow to meet humanitarian needs. The UNCOPUOS, which spearheaded the development of international law for outer space, could endeavour to resolve these issues and develop a consensus on how to harmonise the principles of non-discriminatory access, the

² For details, see National Security Presidential Directives, “U.S. Commercial Remote Sensing Policy, April 25, 2003, FACT SHEET”, online: <<http://www.fas.org/irp/offdocs/nspd/index.html>>.

public right for information, safeguarding the legitimate right to privacy and promotion of commerce.

V. IMPLICATIONS OF CONVERGENCE

Convergence of various technologies has led to the paradigm of information centric approach in lieu of the data centric approach of yesteryears. The powerful geographic information technologies have been driving the evolution of spatial data infrastructures at national level to serve as a highway for a variety of applications by both government and commercial enterprises. Many legal issues are brought to the fore as the GIS products, technologies and services are making a growing impact on the social and economic developmental activities. While the GIS tools, data sets and application programme interfaces could be addressed under software protection legislation, certain GIS assets containing personal data could have legal implications to the vendors and users in case of any misuse or commercial loss. The personal data embedded in census or other data bases are to be governed by data privacy related legislation. Since GIS layers serve as the foundation for several value adding applications which are carried out by different commercial organisations, the questions relating to copyright and IPR also need to be addressed. Thus, in the development and use of GIS technology, various aspects of law come into picture. Education and support to different agencies who are involved in the production and use of GIS products and services assume importance in this context. It is also pertinent to observe that there are different regulatory regimes which had been traditionally evolved based on the specialization. Thus different policy and regulatory regimes are in vogue for satellite images and topographic maps. However, with the advent of GIS, all these varieties of data, including their socio-economic attributes, have converged into information layers. In this scenario, it is appropriate to harmonize different policies into a unified geospatial information policy. In the context of emerging spatial data infrastructures, such unification is the need of the hour.

VI. CONCLUSIONS

High resolution satellites images available from commercial systems are providing essential support to developmental activities including disaster management support, land and water management, environmental monitoring, mapping of land use, planning and managing urban facilities/infrastructure, rural development, cadastral mapping and development of roads/highways, telecomm and the power and many other forms of infrastructure. In this context it is necessary to re-evaluate the UN Principles on remote sensing in order to overcome several limitations and ambiguities. The issues relating to divergent data policies among various nations and the lack of clarity on issues such as liability and responsibilities need to be addressed. Effective measures to overcome concerns on national security and sovereignty and the questions relating to IPR are of paramount importance. A harmonious set of legal guidelines have to be negotiated and agreed upon at an international level. Since satellite images form only one part of the total system of Geographical Information Systems and the National Spatial Data infrastructure, an overarching Geospatial Information Policy needs to be put in place so that GIS systems can be the true enabler for good governance, citizen service and of support to enterprise needs. Adoption of uniform standards for GIS will be key to promote efficiency,

interoperability and seamless spatial interface. Finally, since liability exposure could have substantial impact on the sharing of GIS data, a clear cut liability regime for various facets of activities connected with operation and use of geospatial data is an essential need.

TEN YEARS OF IMPLEMENTATION OF THE INTERNATIONAL CHARTER ON SPACE AND MAJOR DISASTERS: A HISTORY OF SUCCESS?

Fabio Tronchetti*

Abstract: The International Charter on Space and Major Disasters is an international mechanism aimed at enabling the universal sharing of remote sensing data and information for disaster management purposes. The functioning of the Charter is based on international cooperation among space agencies and their commitment to provide satellite imagery to populations affected by disasters. The purpose of this paper is to evaluate the first ten years of implementation of the Charter and to identify key issues that should be addressed to enable the Charter to operate efficiently in the next decade. After ten years of activation, data reveal that the Charter has proven to be an extremely useful tool for providing relief to population in the aftermath of a disaster and for allowing states lacking space technologies to have access to space-based products. However, some shortcomings of the Charter, both of an operational and legal nature, have emerged. These issues are brought out for further discussion

I. INTRODUCTION

Remote sensing technology is an essential tool for monitoring environmental phenomena and managing the consequences of natural and man-made disasters. Awareness of the advantages that space-based information provide to support rescue and relief operations in the aftermath of a disaster has progressively spread among players in space, and initiatives aimed at sharing their information and delivering this information to the affected population have significantly increased in the past few years. The International Charter on Space and Major Disaster (hereinafter, the Charter)¹ represents the first and probably the most successful example of this type of initiative. Basically, the Charter is a mechanism to ensure that after a significant disaster somewhere in the world, space agencies are able to distribute data that they may have available from their Earth observation satellites directly to aid agencies and afflicted states free of charge and without the need for administrative and technical intervention. One of the most significant features of the Charter is that space agencies make available not just raw satellite data but also transformed information, often in the form of maps of the affected areas, which are of immediate use for rescue teams.

Ten years have passed since the Charter became operational in November 2000. It is therefore possible to make an appraisal of the way it has functioned so far, by taking into account, *inter alia*, feedback from the users. Analysis reveals that the Charter has been successful in providing relief to states afflicted by disasters and in enhancing the effectiveness of emergency operations. Simultaneously, issues related to the delivery of remote sensing data and its use by end users, the growing costs

* Fabio Tronchetti: Associate Professor of Law, School of Law, Harbin Institute of Technology, China. email: fabio.tronchetti@yahoo.com.

¹ Charter on Cooperation to achieve the Coordinated Use of Space facilities in the event of Natural or Technological Disaster (usually referred to as Charter on Space and Major Disasters). See e.g. International Charter Space and Major Disasters, "Home", online: <<http://www.disasterscharter.org/home>>. For a text of the Charter, see *Charter On Cooperation To Achieve The Coordinated Use Of Space Facilities In The Event Of Natural Or Technological Disasters*, online: <<http://www.disasterscharter.org/web/charter/charter>> [*Disaster Charter*].

faceted by some space agencies and the increasing number of Charter members, have arisen.

The paper is divided in three main parts. The first one gives an historical overview of the Charter and analyzes its legal status and the mechanism to activate it. The second part focuses on the implementation of the Charter and the issues arising from it. The third part addresses current challenges to the Charter system and possible ways forward.

II. HISTORY, LEGAL STATUS AND ACTIVATION OF THE CHARTER

A. *History and Background of the Charter on Space and Major Disasters*

The process leading to the setting out of the Charter on Space and Major Disaster started at the Third United Nations Conference on the Exploration and Peaceful Use of Outer Space (UNISPACE III).² During this conference the uses of space technologies in support of disaster management³ and the need for enhancing international cooperation so as to enable developing countries to have access to these technologies were discussed.⁴

The main outcome of these discussions was the decision by the European Space Agency (ESA) and the Centre National d'Etudes Spatiales (CNES) to establish a mechanism to provide effective aid for better disaster management based on cooperation between various entities and the sharing of space-based products. ESA and CNES elaborated the text of the Charter, signed it on 20 June 2000 and invited other space agencies to do the same. The first agency which answered this call was the Canadian Space Agency (CSA), which signed the Charter on 20 October of the same year. The Charter became officially operational on 20 November 2000. Since then an increasing number of space agencies has joined it, namely the National Oceanic and Atmospheric Administration (NOAA) and Indian Space Research Organization (ISRO) in 2001, the Argentine Space Agency (CONAE) in 2003, the Japanese Aerospace Exploration Agency (JAXA), the United States Geological Survey (USGS), as part of the US team, and the British National Space Center (BNSC) in 2005 and the German Aerospace Center (DLR) in 2010. The BNSC joined the Charter on behalf of Disaster Monitoring Constellation International Imaging (DMCii), a consortium operating a constellation of five satellites owned by the UK, Turkey, Algeria and Nigeria. Currently, other space agencies, such as the Russian ROSKOSMOS, the Italian Space Agency (ASI) and the Korea Astronomy and Space Science Institute (KASI) are considering joining the Charter. In addition to the space

² The Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space was held in Vienna from 19 to 30 July 1999. The purpose of the Conference was to identify specific areas and actions through which space science and technology could help solve problems of regional and global significance and contribute to economic and social growth, particularly in developing countries. See generally UNISPACE III, "Home", online: <<http://www.un.org/events/unispace3/>>.

³ On the uses of space technologies and products as tools to support disaster management activities, see e.g. M. Onoda 'Satellite Earth observation and systematic observation in multilateral treaties', (2005) 31 J. Space L. 339; N. Peter, 'The use of remote sensing to support the application of multilateral environmental agreements', (2004) 20 Space Pol'y 189.

⁴ 'Disaster prediction, warning and mitigation' in *UNISPACE III, Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space* (A/CONF.184/BP/2 25 May, 1998,) at 3. See also J.I. Gabrynowicz, 'Expanding global remote sensing services' in *Proceedings of Workshop on Space Law in the Twenty-first Century* (New York, 1999) at 97.

agencies, several other bodies, including private satellite operators, are involved in the Charter's activities.

As mentioned in the introduction, the basic idea behind the Charter is to provide satellite data free of charge to all States affected by natural and technological disasters. A State does not need to be a signatory of the Charter to benefit from it.⁵

Each space agency contributes to the Charter by using its own satellite to generate data for disaster management purposes.⁶ These agencies bear the costs of the activities they undertake in the context of the Charter, including those relating to the acquisition of images, processing and value added enhancement. Thanks to this integrated Earth observation mechanism, valuable space-based products and information can be obtained and delivered to crisis victim and rescue teams in a timely and rapid manner. The success of the Charter is proved by the constantly growing number of its activations. While in the year 2001 the Charter was activated only 10 times, currently the annual rate of activations ranges between 40 and 50. As of 7 May 2011, the Charter has been activated 290 times.

B. The Legal Status of the Charter

The legal status of the Charter must be analyzed from a double perspective: on one side from a public international law point of view, on the other side in the light of its place and role within the international legal framework regulating space activities.

As to the first point, the Charter is not an international treaty. Indeed, unlike treaties, which are concluded among States and have binding nature⁷, the Charter is a non-binding instrument bringing together space agencies and national or international space operators and based on goodwill and best endeavours. Membership to the Charter is on a voluntary basis, does not include exchange of funds among members and is open to any space system operator, of private and governmental nature, willing to contribute to the Charter's activities.⁸

As to the second point, the Charter operates within the context of the international legal framework governing activities in outer space, since its operation requires space services, specifically remote sensing of the Earth from space. Two legal instruments have an impact on the functioning of the Charter, the Outer Space

⁵ An analysis of the Charter on Space on Major Disasters is provided by J.L. Bessis, J. Bequignon & A. Mahmood, 'The International Charter "Space and Major Disasters" initiative', (2004) 54:3 *Acta Astronautica*. 183; A. Ito, 'Issues in the implementation of the International Charter on Space and Major Disasters', (2005) 21 *Space Pol'y* 141.

⁶ ESA provides data from ERS and ENVISAT; CNES provides data from SPOT and FORMOSAT; CSA provides data from RADARSAT; ISRO provides data from ISR; NOAA provides data from POES and GOES; CONAE provides data from SAC-C; JAXA provides images from ALOS; USGS provides data from LANDSAT. Through USGS, DIGITAL GLOBE and GEO EYE provides data from Quickbird and Geoeye-1; the partners operating within DMC provide data from ALSAT-1, NIGERIASAT, BILSAT-1, UK-DMC, TOPSAT; CNSA provides data from FY, SJ, ZY satellite series; DLR provides data from TerraSAR-X and TanDEM-X.

⁷ *Vienna Convention on the Law of Treaties, done at Vienna*, 23 May 1969, art. 2 (defining treaty as '[a]n 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').

⁸ According to Article I of the Charter on Space and Major Disasters three forms of participation in the Charter's activities are foreseen: 'parties', 'associated bodies' and 'cooperation bodies'. 'Parties' means the agencies and space system operators that are signatories of the Charter. 'Associated bodies' means the rescue and civil protection, defence and security bodies or other services referred to in Articles 5.2 and 5.3 of the Charter. 'Cooperating bodies' refers to the various bodies, referred to in Article 3.5 of the Charter, with which the parties cooperate.

Treaty⁹ and the UN Remote Sensing Principles.¹⁰ These two instruments have different legal nature: the former is a binding agreement among States, a treaty; the latter is a non-binding document in the form of a resolution of the UN General Assembly.

The Charter gives concrete implementation to several principles enshrined both in the Outer Space Treaty and the Remote Sensing Principles, specifically: (a) the freedom to use outer space; (b) the exploration and use of outer space for the benefit of all countries; (c) international cooperation in space activities; and (d) the sharing of information derived from space activities. With regard to the first principle, the Charter mechanism is based on remote sensing¹¹ from space of areas affected by disasters. Article I, para.1, of the Outer Space Treaty establishes the right of States to carry out space activities and the Remote Sensing Principles sets out the legality of sensing the Earth's surface.

As to the second principle, the Charter is to be considered one of the most successful realization of the idea that the exploration and use of outer space shall be carried out in the interest of all countries and shall be the province of all mankind can be put into practice. This idea, provided for in Article I, para. 1, of the Outer Space Treaty, is reaffirmed in a similar manner in Principle II of the Remote Sensing Principles.

As far as the third principle is concerned, the Charter creates one of the most efficient methods of international cooperation in space activities, as several entities coordinate their operations to provide help and support to populations affected by disasters.¹²

With regard to the fourth principle, the Charter mechanism is based on the universal sharing of information. While the provisions concerning sharing of information are vaguely defined in the Outer Space Treaty¹³, they are more clearly specified in the Remote Sensing Principles. There, Principle XII lays down the right of the sensed States to have access to the data derived from the sensing of their territory on a non-discriminatory basis and on a reasonable cost.¹⁴ Principle XII raises the logical question of whether an endangered state can be refused remote sensing

⁹ *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, done at London, Moscow and Washington, D.C., 27 January 1967* (entered into force 10 October 1967) [*Outer Space Treaty*].

¹⁰ *Principles Relating to Remote Sensing of the Earth from Outer Space*, UNGA Res. 41/65, 3 December 1986 [*Remote Sensing Principles*]. For an analysis of the Remote Sensing Principles see F. Lyall & P. Larsen, *Space Law: a Treatise*, (Farnham & Burlington, Vermont: Ashgate Publishing, 2009) at 420-429; J.I. Gabrynowicz, ed., 'The UN Principles relating to the remote sensing of the Earth from space' (The National Remote Sensing and Space Law Center, University of Mississippi, 2002), online: <<http://www.spacelaw.olemiss.edu/publications/unprincip.pdf>>; C.Q. Christol, 'Remote sensing and international space law', (1988) 16 J. Space L. 21.

¹¹ On the concept of remote sensing see J.M. Read, 'Remote sensing' in *International Encyclopedia of Human Geography* (2009) at 335-346; J. Acker *et al.*, 'Remote sensing from satellites' in *Encyclopedia of Physical Science and Technology* (2004) at 161-202.

¹² *Outer Space Treaty*, *supra* note 9, art. IX; *Remote Sensing Principles*, *supra* note 10, art. V.

¹³ *Outer Space Treaty*, *ibid.*, art. XI (providing that "[s]ignatories are obliged to inform the United Nations Secretary General, as well as the public and the international scientific community, to the greatest extent feasible and practicable, of the nature, conduct, locations, and results of space activities").

¹⁴ On the issue of access to and distribution of satellite imagery and data see R. Jakhu, 'International law regarding the acquisition of satellite imagery', (2003) 29 J. Space L. 65.

data in disaster situation simply because it cannot bear the cost for them.¹⁵ The general tendency is, however, towards reduction, if not total elimination as in the case of the Charter, of charges for remote sensing data. Indeed, the Charter allows for the distribution of data to any afflicted State on a non-discriminatory basis as long as the procedure to activate the Charter is properly followed. In this way the Charter gives also implementation to Principle XI of the Remote Sensing principles, which requires States possessing raw or processed data that may be useful to States affected by natural disasters to transmit those data to the States concerned as promptly as possible.

C. *How Does the Charter Function?*

The Charter is applicable in case of natural and technological disasters, namely situations of great distress involving loss of human life or large-scale damage to property, caused by a natural phenomenon, such as a cyclone, earthquake, flood, or by a technological accident, such as pollution by hydrocarbons or radioactive substances.¹⁶ It is important to point out, however, that the Charter can be activated only during crisis and emergency response, which are the periods immediately after a disaster in the course of which emergency and rescue operations take place.¹⁷ Indeed, a request to trigger the Charter mechanism will generally not be accepted if 10 or more days have passed since the occurrence of a disaster.

This mechanism is normally initiated by an Authorized Users (AU), *i.e.*, civil protection, rescue, defense or security bodies from the country of a Charter member, which are recognized under the Charter as the only bodies authorized to request its services. In the aftermath of a disaster, one or more AUs may call a single number demanding the mobilization of the resources of the member agencies to obtain data and information on that specific disaster. The call is received by a 24-hour on-duty operator (ODO), who checks the identity of the requestor and if the request has been sent in the appropriate format. Once the call has been authorized the ODO passes it to an Emergency On-Call Officer (ECO). The ECO, after having analyzed the nature of the disaster, will take a first look of what satellites are available, what data may be needed and will get in contact with the appropriate space agencies. Upon receipt of the feedback from the agencies, he prepares an archive and acquisition plan according to which those agencies should make their space data and information available to the organization. Generally, the ECO is able to request the data from the space agencies within 24 hours from the moment he is contacted by the ODO. The data provided by the agencies, after being processed and transformed into usable images via the Value-Added Seller, are sent to the end users on an emergency basis. As soon as there are normal operations outside the emergency hours, a project manager, who can be provided by one of the space agencies, or by value added companies or by any third party, is appointed. The project manager, who has very specific knowledge about that particular type of disaster and location, will ensure the accuracy and the delivery of the data to the end users and will organize the creation and distribution of new data. At the end of his activity, he will prepare a report and sent it to the Charter Executive Secretariat.

¹⁵ On this point see Larsen, P., 'Limited right of access to remote sensing data for the prevention and mitigation of disasters' in *Proceedings of the Fifty-First Colloquium on the Law of Outer Space* (2008) 706.

¹⁶ See *Disaster Charter*, *supra* note 1, art. I, para. 1.

¹⁷ See *ibid.*, art. I, para. 4

At the beginning of this section it was indicated that Authorized Users are the only bodies authorized to request the Charter's services. AUs may decide to trigger the Charter's mechanism in two circumstances: (a) if a disaster occurs in their country (direct activation); or (b) if they receive a request to do so from a user from a non-member State (sponsor Authorized User). However, the Charter may also be activated by the United Nations, via one of its agencies like the United Nations Office for Outer Space Affairs (UNOOSA), on behalf of a user from the United Nations. Additionally, users from countries participating in the Sentinel Asia initiative may demand the Asian Disaster Reduction Centre to put forward a request to activate the Charter on their behalf.¹⁸

III. THE IMPLEMENTATION OF THE CHARTER ON SPACE AND MAJOR DISASTERS: POSITIVE FEATURES AND OPERATIONAL AND LEGAL ISSUES

After ten years of Charter operations, a vast number of user feedback is available. The time has thus come to evaluate the Charter implementation and its positive and negative features.

A. The Success of the Charter

During its first ten years of operations the Charter has demonstrated itself to be an extremely useful tool to enhance the quality of disaster management activities. Thanks to the data and maps provided by the Charter members, rescue teams have been able to better organize their efforts and to help people affected by a disaster in more efficient ways.

Several elements can be used to prove the success of the Charter. First of all, as already mentioned, the Charter has been the first international mechanism created to enable the use of space technologies in the event of a disaster. In the years following its adoption, awareness of the advantages of using space-based products to support rescue and relief operations have spread. As a result, several initiatives modeled on the example of the Charter have been launched at international and regional level.¹⁹ This fact shows how valuable the intuition of the founders of the

¹⁸ Sentinel Asia is an initiative among 31 Asian-Pacific countries aimed at enabling collaboration for Earth observation based emergency response. For more information Sentinel Asia, "Home", online: <<https://sentinel.tksc.jaxa.jp/sentinel2/topControl.action>>.

¹⁹ Apart from Sentinel Asia, these initiatives include the UN-SPIDER Programme, the GEOSS initiative and the Tampere Convention. The "United Nations Platform for Space-based Information for Disaster Management and Emergency Response - UN-SPIDER" is a new United Nations programme aimed at ensuring that all countries and international and regional organizations have access to and develop the capacity to use all types of space-based information. The special feature of this programme is its focus on the need to enable access to and use of such information during all phases of the disaster management cycle, including the risk reduction phase. UN-SPIDER is being implemented as an open network of providers of space-based solutions to support disaster management activities so as to operate as a bridge between disaster management and space community. The Global Earth Observation System of Systems (GEOSS) is an initiative launched by the Group on Earth Observation (GEO) to serve as a decision-support tool on a variety of areas. The idea behind GEOSS is to link together existing observation systems, to combine data into a coherent data set and to make data and imagery available through an internet portal. GEOSS addresses nine areas of crucial importance, including protection against natural and man-made disasters. The Convention on the Provision of Telecommunication Resources for Disaster Mitigation and Relief Operations (the Tampere Convention), entered into force on 8 January 2005, aims at improving and coordinating communications services for the purpose of mitigating and relieving disasters. Members to the

Charter was and remains, and how significant the Charter has been in bringing disaster management activities to a more sophisticated and reliable level.

Secondly, the feedback from the Charter's users provides considerable indicators of its usefulness and positive impact in the emergency period consequent to a disaster. In December 2004 a typhoon struck the Philippines islands resulting in the death of 500 people. The Charter was activated by UNOOSA. Very positive feedback was received from national coordinating authorities and government officials.²⁰ At the end of August 2005, as a consequence of the devastating effects of the Hurricane Katrina, the city of New Orleans was submerged by water. On 31 August 80% of the city was flooded with some parts under 4.5 meters. The Charter was activated by the United States Geological Survey and the first map was delivered on September 2nd.²¹ Feedback from the responding agencies indicated that data were used in different ways to assist emergency response efforts. Some of these included identifying damaged building, assessing port damage, locating helicopter landing sites, and evaluating petroleum/hazardous chemical areas.²² End users used the data to monitor water drainage from the city and to coordinate search and rescue efforts. Another example refers to a series of floods which affected several Central and Eastern European states between the end of March and the beginning of April 2006. Authorities in the involved states expressed a high appreciation for the data quality and the quickness in the delivery of valuable products.²³ The user feedback also reveal that one of the main problems emerged during the first period of implementation of the Charter, namely delays in the delivery of useful products to affected populations and rescue teams, is being progressively solved, and are now generally made available within two to two-and-a-half days from the moment of the disaster.

The success of the Charter is furthermore demonstrated by both the increasing number of activations as well as of space agencies member to it.

B. Issues in the Implementation of the Charter

Despite the numerous positive comments received by the Charter users, some issues related to its implementation have been pointed out too. These issues are of both an operational and legal nature. The following outlines the issues raised over the first ten years.

1. Operational problems of the Charter

(a) *Timely delivery of data.* On several occasions users have claimed delays in the delivery of data. A delay may be caused by lack of coordination between Charter partners or by meteorological adversities. For example in the case of the 2006 Philippines landslide, despite the fact that multiple data acquisitions were quickly

Convention are requested to facilitate the provision of prompt telecommunication assistance to mitigate the impact of a disaster.

²⁰ See Charter on Space and Major Disasters, Executive Secretariat, *4th Annual Report* (January–December 2004) at 20.

²¹ Twenty five maps of the flooded areas were produced during the activation period of the Charter.

²² See M. Gad-el-Hak, *Large-Scale Disasters: Prediction, Control and Mitigation* (Cambridge University Press, 2007), pp. 529-531; see also Charter on Space and Major Disasters, Executive Secretariat, *5th Annual Report* (January–December 2005) at 31.

²³ The data were used to help relief organizations and crisis team in evacuating people, locating water pumps and building camps for the evacuated people.

planned, due to technical problems, planning conflicts, or excessive clouds cover, images of the affected areas could not be taken during the first two days following the disaster and, therefore, useful data could not be generated.²⁴ The first useful product was delivered only three days after the disaster, a time which the Philippines authorities deemed to be too long considering the urgency of rescue operations. In the case of a Tsunami which struck Sri Lanka on 26 December 2004, end users had to wait 10 days before crisis data was made available to them.²⁵

(b) *Quality of data.* In other cases, users complained about the quality and accuracy of the received data. For example in the case of the Nyiragongo volcanic eruption of January 2002, several land use maps aimed at detecting lava flows and find possible locations for refugee camps were generated.²⁶ Generally, most of the lava flows were well detected. However, some parts of the lava flows could not be spotted. It was determined that the surface of the lava flow had different textures, partly rough and partly soft, making satellite identification a lot harder. In addition, the lava flowed across the streets without damaging the buildings, making it, thus, difficult to detect it with the 10-m resolutions images which were used for that purpose. The conclusion was that, depending on the nature of the disaster, higher resolution images are needed to provide accurate tools to help emergency operations.

(c) *Uses of Charter products by the affected States: the case of Haiti.* The purpose of the Charter is to generate useful space-based products so as to help States affected by disasters to better respond to them and to enhance the quality of rescue and relief operations. However, it may happen that, due to the catastrophic effect of a disaster, States are unable to perform this task. In particular, it is possible that key personalities, such as high level governmental officials and rescue teams managers, as well as infrastructure, are inoperable. In this regard the case of Haiti is emblematic. On 12 January 2010 a magnitude 7 earthquake, followed by several aftershocks, struck the capital of Haiti, Port au Prince. The effects were devastating: 90 % of the town buildings were destroyed, including most of the governmental ones, and more than 230.000 people died, with an estimate of 3.000.000 people affected. Due to the scale and extent of the disaster the Haitian government was overwhelmed and could not organize an adequate response. Moreover, key functions and infrastructure for disaster response, such as the headquarter of the UN Stabilization Mission in Haiti (MINUSTAH) and communication systems, were made unusable by the earthquake.

This situation, which was characterized by confusion over who was in charge of emergency operations and lack of coordination between governmental and rescue bodies, resulted in delayed and poorly organized aid to the population. The Charter was activated on 13 January without the request of the Haitian government.²⁷

²⁴ For more information on the 2006 Philippines landslide see International Charter Space and Major Disasters, “Landslide in the Philippines”, online: http://www.disasterscharter.org/web/charter/activation_details?p_r_p_1415474252_assetId=ACT-114.

²⁵ See *supra* note 20 at 21. Additional examples of delays in the delivery of useful products were registered in the cases of the 2009 Cyclone in Fiji Islands and Flood in Virgin British Islands. See Charter on Space and Major Disasters, Executive Secretariat, *9th Annual Report* (January–December 2009) at 35.

²⁶ For more information on the Nyiragongo volcanic eruption see International Charter Space and Major Disasters, “Mount Nyiragongo Volcano Eruption”, online: http://www.disasterscharter.org/web/charter/activation_details?p_r_p_1415474252_assetId=ACT-015.

²⁷ The Charter was activated upon request of the French Civil Protection, UNOOSA on behalf of the UN Peacekeeping Mission in Haiti (MINUSTAH), Public Safety of Canada and the American Hazards Program of USGS.

However, as soon as the Charter products (images of the affected areas) were made available by the member space agencies it was not clear who the end users were supposed to be (i.e. the chief mission of MINUSTAH was dead). Additionally, the chaotic state existing in Haiti made it very difficult to take efficient decisions on how to use the Charter products. Another problem was the absence of coordination between subjects involved in the emergency response, with overlapping operations within the Charter and on-site operations. As a consequence, the use of the Charter and of its products was not so successful and efficient in the case of Haiti as it should and must have been.

The Haiti case teaches several lessons. First, there is no fixed procedure to implement the Charter. Depending on type of disaster and the damages caused by it different approaches and actions need to be taken. Second, Charter products must be used only by governmental or rescue experts. Third, if a disaster annihilates the governmental functions of a state, the Charter can be an useful tool only if that state receives a large external support. In particular, Parties concerned in the Charter operations, who are experts in how to handle the aftermath of a disaster, should take a more active role. Specifically, their contribution should not be limited to the delivery of data and maps. This should be followed by the direction of aid and rescue operations and by sending rescue teams to the site.

2. *Legal issues related to the implementation of the Charter*

There are significant issues of responsibility and liability resulting from the Charter application. The Charter itself operates on a best endeavors basis and no liability is involved in any of its operations. To that end, there is a waiver of liability is established in Article 5.4 of the Charter which stipulates that:

The parties shall ensure that associated bodies which, at the request of the country or countries affected by disaster, call on assistance of the parties, undertake to confirm that no legal action will be taken against the parties in the event of bodily injury, damage or financial loss arising from the execution or non-execution of activities, services, or supplies arising out of the Charter.²⁸

The idea of the Charter drafters was to exclude the possibility that they would be held responsible for what is a charitable action.

The lack of a liability regime within the Charter raises the question if such a problem is already properly covered under the existing space law framework. The answer is, however, negative.²⁹ The Outer Space Treaty only refers to states' responsibilities for national space activities and the Liability Convention establishes the liability of the launching state for damage, such as loss or life or damage to property, caused by its space object on the Earth surface.

The possibility that damage might arise from the implementation of the Charter is not so remote. Space data may be misinterpreted or be not so accurate. As a result, wrong rescue interventions may be carried out and more casualties may result. In a similar scenario is uncertain who is going to be held liable for these damage or losses.

²⁸ *Disaster Charter*, *supra* note 1, art. V, para. 5.4

²⁹ See in this regard A. Ito, *supra* note 5 at 147-148.

IV. CHALLENGES TO THE CHARTER SYSTEM AND POSSIBLE WAYS FORWARD

This section addresses existing challenges to the institutional and operational framework of the Charter and their impact on present and future Charter activities. Attention will be focused on three issues: (1) the Charter's increasing membership; (2) the increasing costs; and (3) the scope of the Charter.

A. The Growth of the Charter's Membership

As previously described, the number of Charter's members has progressively increased. This is, certainly, a positive development, as a larger number of data and information can be generated and, eventually, delivered to the affected States. However, this enlarged number of members puts pressure on the Charter system and threatens to compromise its functionality.

When the Charter was established its mechanism could work rather smoothly due to the relative small number of space agencies involved. Indeed, coordination of activities and efforts among these agencies was relatively easy, also because they had previously cooperated in other space projects. Nowadays, with the growing number of space agencies everything becomes more complex. Some of them do not have a history of cooperation and lack specific expertise in disaster management situations. This may lead to overlapping operations, duplication of efforts and absence of coordination, such in the case of Haiti, by seriously harming the effectiveness and usefulness of the Charter. Therefore, Charter members need to tackle this issue and adapt the Charter framework consequently.

Some additional pressure on the Charter system is created by the involvement of private undertakings, such as satellite companies, in the Charter activities. So far this has been regulated through agreements between space agencies and the satellite companies, according to which data and images are transferred from the latter to the former. It remains to be seen if this procedure of ad hoc agreements is the most efficient for the production and delivery of data or if changes into the Charter framework are needed.

B. The Increasing Costs of Charter Membership

The basic principle of the Charter is the distribution of space-based products to States afflicted by disasters free of charge. However, due to the growing frequency of the Charter's activations, the costs that member space agencies – and a few in particular – now bear have started to become problematic. Until now, agencies have managed to cover these costs: however, if the number of calls keeps increasing the situation could go out of control. This state of affairs raises the following questions: how far the system can go? Should a maximum limit of annual activations be fixed? Will the Charter mechanism collapse as a consequence of its success?

The risk connected with the growing costs of the Charter membership is that some agencies might deem such a membership to be too onerous and decide to pull back. They might also consider putting some restrictions, including financial ones, on the distribution of data. Obviously, adequate solutions to avoid such a scenario need to be found. In this respect, the fact that new space agencies are planning to join the

Charter may contribute to reduce costs in the future, as Charter's duties and operations will be shared among a larger number of subjects. In addition, the presence of mechanisms similar to the Charter but operating on a more limited scale, such as Sentinel Asia, may lead to a progressive reduction of Charter activation requests as long as a disaster occurs in one of the areas covered by such mechanisms.

C. The Scope of the Charter

The scope of the Charter is rather narrow. The Charter focuses on post-disaster management, namely response and recovery. It does not cover other disaster management phases, such as preparedness, risk assessment, early warning and mitigation. In certain occasions, end users have claimed that the applicability of the Charter should be extended.³⁰ According to their view, if the Charter wants to be an effective disaster management tools it needs to be able to cover all disaster phases. Therefore, users should be able to activate it for a longer pre- and post-disaster period.

Although, this could be in principle desirable, it is unlikely that member agencies would accept moving in this direction. Indeed, extending the Charter's scope would probably result in an increase of its operational costs.

V. CONCLUSION

Space technologies are a very important tool to enhance human ability to manage and respond to a disaster. The Charter on Space and Major Disaster has been the first international mechanism created to bring these technologies closer to populations affected by disasters and to enable the free distribution of useful space-based products. After ten years of operations it can be argued that the Charter has been successful in improving the quality and effectiveness of rescue and relief activities. Nevertheless, issues of an operational, institutional and legal nature need to be addressed in order to permit the Charter to improve its efficient functioning over the next decade.

³⁰ See for example the Charter on Space and Major Disasters, Executive Secretariat, *3rd Annual Report* (January–December 2003) at 32; E. Bjorgo, 'Space Aid-Current and Potential Uses of Satellite Imagery' in *UN Humanitarian Organisations*, online: <<http://www.usip.org/virtualdiplomacy/publications/reports/12.html>>.

SESSION 4: SPACE LAW AND TELECOMMUNICATION SATELLITE
OPERATIONS

COMMERCIAL USE OF OUTER SPACE AND ITS CHALLENGES TO INTERNATIONAL SPACE LAW

Shouping Li

Abstract: The commercialization of space activities is an ongoing and as of yet incomplete project. This paper seeks to outline the origins, developments and contemporary issues related to the commercialization of outer space. It does so in five sections. The first section provides a brief introduction to the problem, while the second further defines the trends towards commercializing outer space and their relation to privatization and the militarization of outer space. The third section then explores the legal bases on international space law, looking at the UN treaty system, supplementary international legal agreements, and systems of national legislation as three legal bases for space activities. In the fourth section, it highlights current problems in space law, particularly in relation to the subjects of law and the breadth and depth of their activities. The fifth section then briefly concludes the paper.

I. INTRODUCTION

The successful launch of Sputnik I by the Soviet Union on 4 October 1957 opened the gate to outer space, realizing humanity's dream of space travel and exploration. It also began a fierce competition between the Soviet Union and the United States to exploit the space environment.¹ The history of space activities demonstrates that the development of space technology during the Cold War between the Soviet Union and United States was for military purpose.² Thus, the body of international space law developed in that period made the peaceful exploration and use of outer space as its main principal to regulate the conduct of human beings in outer space in order to prevent the possibility of an arms race in outer space.

The objectives of space activities have significantly changed over the past five decades in a number of ways. On the one hand, a critical shift in discussions on the exploration and use of outer space occurred as persons began to draw distinctions between militarization and weaponization.³ On the other hand, with the development of space technology and the privatization of space activities, the commercialization of outer space has come to the fore. Indeed, the commercial use of outer space is a main challenge for the development of international space law, especially considering the issues of militarization and weaponization which continue to lie underneath all space activities.

· Shouping Li, Ph.D in Law, Professor of Law School of Beijing Institute of Technology, Dean of Space Law Institute of Beijing Institute of Technology. Professor Li's research focus lies in the areas of international space law and international organization law.

¹ Marco Pedrazzi & Haifeng Zhao, *Elements of International Space Law* (Heilongjiang People's Press, 2006) at 4

² Michael Harr & Rajiv Kohli, *Commercial Utilization of Space: An International Comparison of Framework Condition* (Battelle Press 1990) at 3.

³ Shouping Li, *Militarization of Outer Space and the Relative Legal Regulations*, (2007) III Studies in L. & Bus.

II. THE COMMERCIALIZATION OF OUTER SPACE: AN OVERVIEW OF CURRENT TRENDS

Generally speaking, the commercial use of outer space relates to the conduct of space activities for the purpose of making profit.⁴ The main purpose of commercialization, and thus the focus of commercial space activities, is the gain of profit. With the development of space technology, the scope for developing the commercial uses of outer space is enlarging and the methods for commercial exploitation are becoming ever more creative.

A. *Commercial Space: Five Areas for Exploration*

Current commercial developments in outer space focus on a wide number of areas, including the launching of satellites, satellite communication, remote sensing services, the creation of outer space products and exploitation of space resources. The provision of commercial launch services, or commercial carrier service, is one of the most developed areas of commercial space use. There are currently two types of commercial carrier services: namely, the satellite launch services and space tourism services.

Commercial satellite launch services began with the launch of the Early Bird satellite from Cape Canaveral on April 6, 1965.⁵ Despite its early origins, before the 1980s the USA and Soviet Union maintained a government-controlled duopoly over satellite launch services. This duopoly broke down in the 1980s: currently public and private entities in, *inter alia*, the US, Russia, China, India and France possess the capacity to launch satellites. China is an excellent example of a country with a successful commercial satellite launch system; indeed, by May 15, 2009, China had seven types of Changzheng rockets capable of providing international commercial launch services on which it has provided 30 international commercial launch services and in-orbit deliveries for 13 countries and districts.⁶ According to one industrial report, the income of space activities around the world will be \$ 500 to 600 billion by the end of 2010. The income of satellite industry will be \$200 to 300 billion. In the coming decade, about 700 commercial satellites will be launched.⁷ These developments will have a large positive impact on the launch industry. Its profitability means that satellite launch services will remain a main area of commercial use of outer space in the future.

Space tourism is a new product of commercial activities in the 21st century, with US citizen Tito's flight from the Baikonur Cosmodrome in Kazakhstan on April 28, 2001 making him the world's first space tourist. Generally speaking, space tourism denotes any commercial activity that offers customers direct or indirect experience with space travel.⁸ At least four types of activities can be regarded as

⁴ Qizhi He & Huikang Huang, *Outer Space Law* (Qingdao Press. 2000) at 266.

⁵ Early Bird is a satellite owned by the ITU, launched by the US corporation DELTA Co. from Cape Canaveral on April 6, 1965. Before the launch of Early Bird, satellite launches were non-commercial and carried out by US and Soviet Union. The launch of Early Bird is the first time of commercial launch of satellite through international cooperation.

⁶ See online: Great Wall Industry Corporation <<http://cn.cgwic.com/LaunchServices/LaunchRecord/Commercial.html>>.

⁷ See online: Xinhuanet <http://news.xinhuanet.com/mil/2009-03/23/content_11055665.htm>.

⁸ Stephan Hobe & Jurgen Clopenburg, "Towards a New aerospace Convention? Selected Legal Issues of "Space Tourism" in *Proceedings of the 47th Colloquium on the Law of Outer Space* (2004) 377 at 377.

space tourism: parabolic aircraft flights, high-altitude flight near outer space, suborbital flight, and orbital flight. Space tourism is fast becoming an important element in commercial space use. According to a report of NASA, space tourists around the world will be 5 million by 2030. The market of space tourism will increase to \$ 60 billion.⁹ This number is much larger than satellite market. As a result, some people say together with information industry, space industry is the new engine of 21st century's economy.¹⁰

With over one hundred states providing satellite telecommunications and a market exceeding \$2 trillion annually, satellite communications services are both the oldest and most popular commercial use of outer space. Communication satellites provide telephone, internet, live TV and digital video services. Internationally, they are regulated within the framework of the ITU. Additionally, GPRS service is also provided by satellites. Unlike satellite telecommunications, GPRS services are currently monopolized by US GPS. While the European Space Agency's Galileo project and China's Plough project both hope to compete with the US GPS system, it will take time to break the US' current monopoly.¹¹

A third category of commercial space activity is remote sensing services, which is a combination of space science, electronic science, optics, computer science and geology, and is a vital part of the world of modern high-tech. Observation data obtained by satellite remote sensing technology has a diverse range of uses, and is an important source of information for, among other things, disaster prevention, mine exploration and military target exploration. While the applications are far reaching, the cost of satellite remote sensing is high, its customers very few and its profits very low. Thus, remote sensing services are predominantly developed to provide information products to related state, district, department and enterprises users to promote the development of satellite application industry.

Outer space has also proven to be a wonderful laboratory. Outer space has no gravity, and thus provides a unique, "pure" environment for medical, biology and electronic research and facilitates different kinds of experimentation that cannot be done on Earth. To utilize this commercially, outfits rent space to the traditional medicine, biology and electronic industries so that they may conduct outer space experiments. With the further development of space technology, the commercial provision of outer space experiment and carrier services to medicine, biology and electronic research is a new space industry.

In addition to refining, creating and synthesizing materials in space from Earth-based materials, it is also possible to explore and commercially exploit resources already present in the space environment. Outer space resources include natural resources on the moon and other planets, such as mineral resources, clean materials for power and solar energy. The exploration and use of outer space resources is an important project of space-faring countries. As the common heritage of human beings, the commercial exploration and use of outer space resources is inevitable.

⁹ Patrick Collins, "The Space Tourism Industry in 2030" Space Future (February 2000), online: <www.spacefuture.com/.../the_space_tourism_industry_in_2030.html>.

¹⁰ Liang Zhang, Challenges from Commercial Activities in Outer Space to International Law (Masters' Thesis, Hunan Normal University, 2007) at 31 [*unpublished*].

¹¹ See <http://www.beidou.gov.cn/2010/01/15/20100115510f45f47f984c489ba2d69406e47ca8.html>. Beidou.com

B. *Space and the Tensions between Commercialization, Privatization and Militarization*

The development of commercial space has meant a growth in space technology. It has not, however, simply taken away the potential for the military use of outer space. On the contrary, the interrelation between civilian and military technology has arguably boosted the range of military applications in space.

On the one hand, the commercialization and privatization of outer space use are developing simultaneously and are largely complementary processes: the commercialization of outer space attracts private entities while the participation of private parties promotes the further development of commercialization of outer space. Theoretically, they represent two continuous phases in the development of space activities.¹² In the start-up phase of space activities, governments were needed to support the development of space technology and space infrastructure. With the technology and infrastructure in place and many risks accounted for, a market for space activities can develop and attract private capital. At the same time, the government can incentivize private capital to invest and compete in the space industry to promote the development of space technology and limit public expenditure.

Beginning in the 1980s, the space industry is certainly undergoing the second phase of development.¹³ Starting with telecommunications, commercial applications and privatization are beginning to find their place in space transportation, satellite remote sensing, industrial experimentation and space resources exploitation. In the telecommunications industry, states have restructured their national markets to allow for private providers to enter and compete in telecommunications markets and the ITU was reorganized to meet the requirements of commercial. In the field of space transportation, privatization is well underway in the space launch and space tourism sectors.

On the other hand, commercialization and privatization has not necessarily meant a reduction in the potential for militarization. Indeed, the technologies themselves continue to promote a combination of military and civilian purposes. Early space activities were developed for military purposes; for example, most remote sensing satellites and telecommunication satellites have military purposes. The development of anti-satellite weapon and space-based weapon demonstrates that the militarization of outer space is realized and is heading toward weaponization. Their use for commercial applications does not change their military capabilities. Indeed, the militarization, weaponization and commercialization of outer space are developing side by side.

III. LEGAL AND JURISPRUDENTIAL BASES FOR THE COMMERCIAL USE OF OUTER SPACE

There are three distinct bodies of law that control the commercial use of outer space. The first, the body of space law developed under the United Nations, does not contain any clear provisions governing the commercial use of space; indeed, if anything the 1967 Outer Space Treaty, or OST, demonstrates that its drafters never expected a

¹² K. Tatsuzawa, *Legal Aspects of Space Commercialization* (Tokyo: CSP Japan Inc., 1992) at 10.

¹³ Harr & Kohli, *supra* note 2 at 3.

strong commercial presence in space.¹⁴ These agreements do, however, provide an important indirect jurisprudential basis for the commercial use of outer space. Additionally, a second body of law composed of international treaties and customs developed by the international community over the past five decades further improved, refined and replenished international space law, providing an important direct legal basis for the commercial use of outer space. Finally, the development of a number of national space legislations in space-faring countries has come to represent the most important legal basis to promote and regulate the commercialization of outer space. This section presents each body of legal material in turn.

A. The Body of UN Legal Materials as an Indirect Legal Basis for the Commercial Use of Outer Space

The United Nations is responsible for generating a body of international space law consisting of five international space law treaties and five international documents related to space activities adopted by the UN General Assembly.¹⁵ These international treaties and documents provide indirect legal and jurisprudence basis for the commercial use of outer space.

Critically, the existing international space law system under the framework of UN makes it possible for private entities to participate international space activities. Because of the high investment, high risk and high technology requirements of space activities, the original objects of space law were thought to be only countries and inter-governmental organizations. The UN system, developed in the 1960s and 1970s, reflects this thought. Nevertheless, the existing system leaves room for the private entities to participate in space activities.

Principal among the provisions in the UN system is Article 6 of the OST. Article 6 stipulates that 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. Although it directly regulates state behavior, it provides an indirect legal basis for non-governmental entities to participate space activities. It means non-governmental entities can be the subject of space activities, but is not the directly responsible under international space law. Paragraph two of the same Article, which states that the activities of non-governmental entities in outer space, including the Moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty, further proves that non-governmental entities can participate in space activities as long as it gets authorization and supervision by state.

¹⁴ John Adolph, "The Recent Boom in Private Space Development and the Necessity of International Framework Embracing Private Property Right to Encourage Investment" (2006) Int'l Law.

¹⁵ Five international space law treaties refer to: *Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space*, adopted on 13 December 1963 (resolution 1962 (XVIII)); *Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting*, adopted on 10 December 1982 (resolution 37/92); *Principles Relating to Remote Sensing of the Earth from Outer Space*, adopted on 3 December 1986 (resolution 41/65); *Principles Relevant to the Use of Nuclear Power Sources in Outer Space*, adopted on 14 December 1992 (resolution 47/68); *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*, adopted on 13 December 1996 (resolution 51/122).

There is not a clear consensus on the exact meaning of the provision; for example, there is still a dispute on whether the term “non-governmental entities” includes private entities. The majority of scholars hold that this provision provides legal basis for private entities to explore and use outer space.¹⁶ Other scholars, however, insist that this provision is to prevent private entities from joining space activities.¹⁷ Despite the disputes, it is certain that the OST indirectly permits private entities carry out space activities as long as it is bound by national space legislation.

Secondly, the existing body of international space law system under the UN framework provides an important jurisprudential basis for the commercial use of outer space. Nevertheless, it leaves a number of issues unresolved. Principal among these is how to define the ownership of the commercially-used space resources. Indeed, it is a fundamental precondition for the international exploitation of space resources. A related second issue deals with the ownership of commercially-used space assets, as it is the basis for the retention of benefits and attribution of responsibility resulting from the commercial use of outer space.

Both the OST and Moon Agreement provide a legal basis for the development of these issues. On the one hand, Article 1 of the OST states that the exploration and use of outer space shall be the province of all mankind on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies.¹⁸ Article 2 further regulates that outer space is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.¹⁹ The article has been read to imply that outer space and other celestial bodies are the common heritage of all mankind.²⁰ Applying the common heritage of mankind principle to the moon or another celestial body creates a number of important legal consequences. For one, the moon is no longer subject to national appropriation by any claim of sovereignty, by means of use or occupation, or by any other means.²¹ Perhaps the most important principle stemming from the common heritage of mankind is that once applied 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. Article 11 of the Moon Agreement makes the common heritage of mankind principle explicit in relation to the moon and other celestial bodies.²²

The aforementioned provisions demonstrate that outer space and its resources are the common heritage of all mankind. Accordingly, the commercial use of outer space and its resources should be guided by this principal. According to this principal, outer space and its resources are neither the property of all countries nor the property of nobody. As the common heritage of all mankind, outer space and its resources should be allowed to be commercially used under international exploration system.

On the other hand, Article 8 of the OST stipulates that a State Party to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in

¹⁶ K. Tatsuzawa, *Legal Aspects of Space Commercialization* (Tokyo: CSP Japan Inc., 1992) at 43.

¹⁷ *Ibid.*

¹⁸ *Outer Space Treaty*, *supra* note 15, art. 1

¹⁹ *Ibid.*, art. 2

²⁰ Lynn M. Fountain, “Creating Momentum in Space: Ending the Paralysis Produced by the “Common Heritage of Mankind” Doctrine” (2003) 35 Conn. L. Rev. 1753.

²¹ *Outer Space Treaty*, *supra* note 15, art. 2

²² *Moon Agreement*, *supra* note 15, art. 11.

outer space or on a celestial body.²³ It follows that the ownership of objects launched into outer space, including objects landed or constructed on a celestial body, and of their component parts, is not affected by their presence in outer space or on a celestial body or by their return to the Earth. The Article thus clarifies the ownership of commercially used space assets and defines the subject of liability in the commercial use of outer space. According to this Article, state of registry owns the particular space asset in question and also the subject of liability for the space asset.

Finally, the existing body of UN space law provides a set of legal guarantees for the commercial use of outer space. Specifically, two aspects of the law reflect this. First, both the OST and Rescue Agreement can and should be read to guarantee for the safety of space tourists. Specifically Article 5 of the OST requires contracting parties to rescue astronauts.²⁴ The Rescue Agreement further provides the legal obligation rescue personnel of spacecraft.²⁵ Although the aforementioned international treaties do not state whether space tourists are the objects of rescue, they should be within the broad definition of the envoy of mankind defined in OST and astronauts. Given a broad interpretation, space tourists should fall within the scope of rescue system in outer space.

The Moon Agreement provides similar protections for persons on the moon.²⁶ For this purpose parties shall regard any person on the moon as an astronaut within the meaning of Article V 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 and as part of the personnel of a spacecraft within the meaning of the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space. Apparently, the Moon Agreement regards all persons who leave the surface of the earth as astronauts or the objects of rescue.

Additionally, Article 6 and Article 7 of the OST and the Liability Convention provided international law guarantee to international liability caused by commercial launch activities. Outer space liability system attributes liability to state. This not only helps the protection of victim in space activities, but also promotes the development of the commercial launch market.

B. Existing Multilateral and Bilateral Treaties relating to Space Activities as Sources of International Law Regulating Commercial Space

The UN treaty system envisions space utilization as a domain for a limited number of public bodies interested in outer space for military and political purposes.²⁷ The drafters of the treaty system did not expect that outer space would be used for commercial purposes and thus did not expressly develop any commercial regulation. Subsequent developments, such as those mentioned in section II of this paper, as well as international cooperative initiatives such as the International Space Station (ISS), quickly required additional rules be built into the system. To that end, the

²³ *Outer Space Treaty*, *supra* note 15, art. 8

²⁴ *Ibid.*, art. 5

²⁵ *Ibid.*

²⁶ *Moon Agreement*, *supra* note 15, art. 10

²⁷ *Supra* note 2

international community formed a series of multi-lateral and bilateral treaties which supplement the regulations of the commercial use of outer space found in the *corpus juris spatialis*.

The earliest form of sector-specific regulations governed the commercial use of satellite telecommunications. In 1961, through the UNGA the international community recognized the potential for satellite communication, declaring that the communication by means of satellites should be available to the nations of the world as soon as practicable on a global and non-discriminatory basis.²⁸ Additionally, the international community established several international organizations to enhance the application of satellite communication, principally: the International Telecommunications Satellite Organization (INTELSAT) in 1963;²⁹ the International Maritime Satellite Organization (INMARSAT) in 1976;³⁰ and the European Telecommunications Satellite Organization (EUTELSAT).³¹ Some other organizations like Arab Satellite Communications Organization were also established. The Conventions establishing these organizations remain the main legal sources for international telecommunications law, even after their privatization.

The most common area of commercial use of space is commercial space transportation. In the practice of commercial space transportation, it is the practice of parties interested in the launch to clarify each party's responsibilities through one or more international agreements. For example, during the early stages of space launch commercialization in China, it signed with the United States: the Memorandum of Agreement on Satellite Technology Safeguards; the Memorandum of Agreement on Liability for Satellite Launches; and the Memorandum of Agreement Regarding International Trade in Commercial Launch Services. These agreements only have binding force with relation to the US and China; however, they also provided important references to other countries' national commercial launch services and have thus influenced commercial space development beyond the bilateral agreement.

With respect to the commercial use of the ISS, member states also adopted a series of intergovernmental agreements, or IGAs, and Memoranda to regulate their cooperative activities. To establish the ISS, the US, Canada, Japan and some European countries concluded a series of IGAs and Memoranda in 1988. As of Russia's inclusion in 1998, the IGA covered 15 countries.³² The IGA established a new system to deal with the issues in the commercial use of outer space onboard the station. The jurisdiction, exemption of liability, and intellectual property systems are important international legislative attempts to deal with new issues in the commercial use of outer space and which provide important references to the improvement of international space law.

C. National Space Legislation Regulating the Commercial Use of Outer Space as the Main Legal Source for Commercial Space Law

²⁸ UNGA Res. 1721 (XVI), International Cooperation in the Peaceful Uses of Outer Space, online: <http://www.oosa.unvienna.org/oosa/SpaceLaw/gares/html/gares_16_1721.html>.

²⁹ Provisional Agreement of International Telecommunications Satellite Organization

³⁰ *Convention on the International Maritime Satellite Organization and Operating Agreement, done at London*, 1 September 1976.

³¹ *Convention and Operating Agreement relating to EUTELSAT, opened for signature at Paris*, 15 July 1982 (entered into force 1 September 1985).

³² Members of ISS include USA, Canada, Japan, Russia, and 11 members of ESA (Belgium, Denmark, Netherland, France, German, UK, Italy, Norway, Spain, Sweden, Switzerland).

The third source of commercial space law is national legislation and regulation. Compared to international legislation, national legislation is more comprehensive in scope. Currently, national space legislations focus on four aspects: satellite communication; space launch services; and outer space experiments and protection of the results. For example, in the US these issues are governed by a set of legislative materials such as the Communications Satellite Act 1962, the Commercial Space Launch Act 1984, the Land Remote Sensing Policy Act 1992, and the Commercial Space Act 1998. This base of legislation provides a comprehensive set of guarantees for the commercial use of outer space in the US. It also provides references for other countries' space legislation.

IV. CHALLENGES TO EXISTING INTERNATIONAL LAW IN THE COMMERCIAL USE OF OUTER SPACE AND ITS IMPROVEMENT

Section III presents the three main sources of law governing commercial space use, with the UN system providing a general legal basis, and series of multilateral and bilateral treaties and national legislation providing more substantive legal regulations. Yet the general rules were constructed at a time when the actors were states and their actions military and political in nature. Other international and national legal instruments have been partial fillers. With the development of commercial use of outer space, the existing international legislation and national legislation on commercial use of outer space continue to be challenged with respect to both the range of actors and the range of activities.

A. Shifting Subjects of Space Law as a Challenge to the Commercial Use

The traditional approach to space law has been that the subjects of space activities are states and inter-governmental organizations. Thus, traditional international space law falls within the realm of public international law. However, the commercial potential of outer space has and will continue to attract private entities.

The entry of private capital into the space arena has changed the structure of space activities; however, it has not changed the legal nature of the subjects of space activities. According to Article 6 and Article 8 of the OST, even non-governmental entities jointly carry out space activities, the subjects of space activities are still states. States enjoy the rights to supervise and manage space activities continuously and remain directly internationally liable for damages caused by it or its nationals.

At this point, however, actors are clearly not only states. The cases of INTELSAT, INMARSAT and EUTELSAT are excellent examples. Each has been privatized, and is no longer an inter-governmental organization but rather a special private entity. These private entities carry out satellite communication activities directly, enjoy international rights and undertake international obligations directly.³³ Due to the special international status of these organizations, the subjects of existing international space law changed. It would not be surprising if similar international space law subjects will come about in the areas of commercial launch, satellite remote sensing, communication navigation and space resources exploitation were to be developed in the future.

³³ G.Lafferranderie, "The Roles of International Organization in Privatization and Commercial Use of Outer Space," in *Proceedings of the Workshop on Space Law in the 21st Century* (New York: United Nations) at 131-136.

With the emergence of private entities in space activities, existing international space law needs to be improved to adapt to the trends of commercialization. Firstly, existing international space law currently only provides legal basis for states and inter-governmental organizations to explore and use outer space freely. Whether non-governmental entities can do so is still a problem. Indeed, Article 6 of the OST states that the activities of non-governmental entities in outer space, including the Moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty. This provision can be understood as private entities can't carry out space activities if they haven't obtained authorization and supervision from State. If it is the case, non-governmental entities are not the subjects of space activities. There is nevertheless a trend to make non-governmental entities the subjects of international space law. In existing space treaties, international organizations are defined to be inter-governmental organizations.³⁴ To keep with the trend and promote commercial space, it is necessary to define international organizations in international space law as both inter-governmental and non-governmental organizations.

Secondly, if international organization should mean both inter- and non-governmental organization, the international space liability system and registration system for space objects should accommodate both. The current rules provide only for inter-governmental organizations, while the member states remain jointly liable along with the organization.³⁵ The existing international legal system thus cannot be applied to private entities. Similarly, the subjects of the existing registration system for space objects are state of registry and intergovernmental organizations. At the moment, space objects launched by private entities or non-governmental organizations do not need to directly register their object, as the Registration Convention does not apply. Indeed, even if the rules relating to inter-governmental organizations were to apply, the application of the Convention still requires a majority of the member states be signatories to the Convention. To help improve the registration system, international organizations should include both inter-governmental and non-governmental organizations.

Finally, when the subjects of international space law were states and intergovernmental organizations, it was feasible to have the principles that the exploration and use of outer space shall be carried out for the benefit and in the

³⁴ Article 13 of OST states that the provisions of this Treaty shall apply to the activities of States Parties to the Treaty in the exploration and use of outer space, including the Moon and other celestial bodies, whether such activities are carried on by a single State Party to the Treaty or jointly with other States, including cases where they are carried on within the framework of international intergovernmental organizations. Article 6 of Rescue Agreement stipulates that For the purposes of this Agreement, the term "launching authority" shall refer to the State responsible for launching, or, where an international intergovernmental organization is responsible for launching, that organization. Article 22 of Liability Convention states that references to States shall be deemed to apply to any international intergovernmental organization which conducts space activities if the organization declares its acceptance of the rights and obligations provided for in this Convention. Article 7 of Registration Convention stipulates that with the exception of articles VIII to XII inclusive, references to States shall be deemed to apply to any international intergovernmental organization which conducts space activities if the organization declares its acceptance of the rights. Article 16 of Moon Agreement also regulates that With the exception of articles 17 to 21, references in this Agreement to States shall be deemed to apply to any international intergovernmental organization. International organizations in these treaties are intergovernmental organizations.

³⁵ *Liability Convention*, *supra* note 15 art. 22. See also Shouping Li & Yun Zhao, *Introduction to the Law of Outer Space* (Guangming Daily Press, 2009). at 239.

interests of all countries and be for peaceful purposes. However, in the trend of commercialization of outer space, the use of outer space becomes for the purpose of profit with the participation of private entities in space activities. There is thus an imbalance between private interest and the interests of all states. If the trend towards commercialization is to continue, international space law should consider these interests and try to balance between the interests of all sides. One way of doing this is to switch “countries” for “mankind”: if “for the benefit and in the interests of all countries” is changed to “for the benefit and in the interests of all mankind”, and “mankind” includes states, international organization as well private entities, the commercial use of outer space will be further improved.

B. The Deepening of Commercial Space Activities as a Challenge to Space Law

The widening and deepening commercial uses of space have also created important legal challenges to outer space’s traditional legal regime. There are at least five areas where these challenges are currently present, and which require the space community’s attention.

Firstly, the data of satellite remote sensing is of great importance to earth observation, weather and meteorological observation, maritime communication and mineral exploration. The market of satellite remote sensing promotes the development of commercialization and privatization. In existing international space law, there are barely legal regulations on remote sensing except the Principles relating to Remote Sensing of the Earth from Outer Space.³⁶ The Principles, however, are without binding force and create some problems for the development of remote sensing as a commercial enterprise.

To promote the commercial use of remote sensing data, at least three aspects need to be improved: first, there needs to be a clear determination as to whether it is legal to sense a state’s territory without its permission; second, space needs to be made for commercial remote sensing activities to enter the field; third, there needs to be some form of international legal protection of the data obtained from remote sensing. To do this, the international community should move the contents of the Principles into an international convention. It should also establish a system for the free trade of remote sensing data. Such a move would accord with international practices over the past twenty years.³⁷ At the same time, UNCOPUOS should actively work to move the free trade system into law.

Like the *corpus*, the Principles only pertain to the remote sensing activities of states, meaning the activities of international organizations and private entities lack a clear legal basis. The scope of subjects should thus be appropriately widened within any proposed convention system.

Additionally, the role of intellectual property rights in remote sensing data must be adequately considered. Existing international space law and intellectual property law do not adequately protect remote sensing data, which may hinder its development. However, there are still disputes on whether remote sensing data should be protected as intellectual property rights. Remote sensing data are raw data, captured as natural waves or unstable signals. It is thus hard to call it intellectual property and provide relative protection for it. One way of addressing this issue is to

³⁶ See generally *Remote Sensing Principles*, *supra* note 15.

³⁷ Joanne Irene Gabrynowicz, “Expanding Global Remote Sensing Services” in *Proceedings of the Workshop on Space Law in the 21st Century*, *supra* note 33, 101.

protect remote sensing data as such in order to promote the trade and commercial use of remote sensing data.

Secondly, with respect to space tourism, it is necessary to improve the existing rescue system both to ensure the safety of the space tourist and to promote the further development of space tourism. In the past, persons entering space were government personnel; space tourists were not foreseen and thus not specifically protected under the traditional rescue system.³⁸ It is certainly not helpful for the development of space tourism. To correct this gap, the UNCOPUOS should play an active role in coordinating the objects of a comprehensive rescue system and promote an international document to further define the concepts of astronaut and personnel of spacecraft.

Thirdly, members of the ISS should further address issues related to commercial activities in the ISS, especially in relation to patent and trade secrets. Generally, two characteristics define objects protected by existing intellectual property rights systems. The first characteristic is territoriality. Intellectual property rights are protected in the territory where it is granted. For instance, while TRIPS requires member states to protect trade secrets, whether and the extent to which trade secrets are actually protected depend on the domestic law of each member state, which determines what kind of information can be protected, what the composition of intellectual property rights. The second defining characteristic is the creative origin of the product: intellectual property rights are exclusive rights given to persons over the creations of their minds.

One of the characteristics of the intellectual property rights in the commercial use of outer space is the specialty of its location. Intellectual property rights are mainly created in space lab, outer space or other celestial bodies. According to the Outer Space Declaration of 1963 and the Outer Space Treaty of 1967, outer 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.³⁹ Thus, outer space and other celestial bodies are not subject to any country's sovereignty. It means that the domestic law of any country cannot exercise jurisdiction over intellectual property rights in outer space, which is in conflict with the territoriality of intellectual property rights.

In terms of territoriality, intellectual property created in a space lab or the ISS can at times be controversial. Some people suggest that a space lab be deemed a "floating territory" of a sovereign state, which may exercise jurisdiction over it.⁴⁰ Others hold that jurisdiction can be exercised over it because, like a ship, it is registered to a state and not territory *per se*.⁴¹ This accords with Article 8 of the OST, which provides that the state of registry retains jurisdiction and control over the

³⁸ There are nevertheless some useful provisions in the *corpus* that may give a basis for protection. See *Outer Space Treaty*, *supra* note 15, art. 5 (astronauts); *Rescue Agreement*, *supra* note 15, art. 4 (personnel of spacecraft); *Moon Agreement*, *supra* note 15, art. 10 (referencing both the OST art. 5 and Rescue Agreement art. 4).

³⁹ *Outer Space Treaty*, *supra* note 15, art. II; *Outer Space Declaration*, *supra* note 15, art. 3. See also Li & Zhao, *supra* note 35 at 229, 251.

⁴⁰ See *Gardiner v. Howe*, 9 F.Cas. 1157 (C.C.D.Mass.1865) (No. 5219); *Marconi Wireless Tele. Co. of America v. United States*, 53 U.S.P.Q. 246 (Ct.Cl.1942) vacated and remanded on other grounds, 320 U.S. 1 (1943). See also *Brown v. Duchesne*, 60 U.S. (19 How.) 183 (1856) (holding that French patent law applied to a French ship in an American port).

⁴¹ See *United States ex rel. Clausen v. Day*, 279 U.S. 389 (1929); *Cunard Steamship Co. v. Mellon*, 262 U.S. 100 (1923); *Scharrenberg v. Dollar Steamship Co.*, 245 U.S. 122 (1917).

object, as well as over any personnel on it while in outer space.⁴² Whether because of its territoriality or its registration, there is no doubt that at least one state can exercise jurisdiction over intellectual property rights in outer space.

In the case of the ISS, the IGA contains clear regulations for patents generated in the ISS. According to the provisions, each space capsule has been registered by the providing state, and the state of registry retains jurisdiction over such rights. While this solution works for the ISS, it does not solve issues of intellectual property rights for other states. Indeed, the issue of IPRs in space goes to all space activities: inventions on other celestial bodies as well as the protection of remote sensing data also require protection. It seems that a comprehensive international legal system is urgently needed for the protection of IPR in outer space.

As for the creativity element, there are many points that still need clarification. For example, how to define the creativity of new varieties of plants in outer space? Its novelty and practicality are well recognized, but how to examine its creativity? Such new varieties of plants are generated because of the environment of micro-gravity, but such environment is not a creation of people's minds. According to the domestic legislation of many countries, only those varieties of plants which are developed through the creative human faculty are protected. For instance, Article 2 of Regulations of the PRC on the Protection of New Varieties of Plants that a new variety of plant means a cultivated variety, or a developed one based on a discovered wild plant which possesses novelty, distinctness, uniformity and stability, and which is designated by an adequate denomination.

Fourth, the exploration and use of outer space resources is part of the space strategy of many states; however, the legal status of space resources remains unclear. The OST provides that outer 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.⁴³ The Moon Agreement goes further, clarifying that the Moon and its natural resources are the common heritage of mankind.⁴⁴ The common heritage principle is extremely controversial. Some scholars regard this principle as a fundamental principle in the use of outer space, while others argue that this principle is merely a policy and is not accorded the protection of international law.⁴⁵ Still others are of the opinion that the concept is meaningless and of no practical value.⁴⁶ In fact, the OST does not directly express the principle of common heritage of mankind. Moon Agreement set up this principle, but Moon Agreement only has 13 member states. It is not universally recognized. And OST only prohibits national appropriation, not private appropriation.⁴⁷ These indicate that the legal nature of space resources is not clear in international space law.

With the further exploration of outer space, it is ever more important to define the status of outer space and its resources. Only if its status is clarified, can the

⁴² *Outer Space Treaty*, *supra* note 15, art. 8.

⁴³ *Ibid.*, art. 2.

⁴⁴ Art. 11.

⁴⁵ On the first, see Fountain, *supra* note 20. On the second, see Peter Malanczuk, "Actors: States, International Organizations, Private Entities" in G. Laffarandier & d. Crowther, eds., *Outlook on Space Law over the Next 30 Years: Essays Published for the 30th Anniversary of the Outer Space Treaty* (1997) at 32-33; Arthur W. Blaser, "The Common Heritage in its Infinite Variety: Space Law and the Moon in the 1990s" (1990) 5 J. of L. & Tech. 79, 93 (1990).

⁴⁶ On the third see Christopher C. Joyner, "Legal Implications of the Concept of the Common Heritage of Mankind" (1986) 35 Int'l & Comp. L. Q. 198.

⁴⁷ Fountain, *ibid.*

subjects and methods of exploration be settled. The common heritage of mankind principle is advocated by developing countries that the use of outer space must be for the benefit and the interest of mankind as a whole. Thus, the principle, as interpreted by developing countries, maintains that the outer space does not belong to any one state. Rather, it belongs to all nations and any benefit derived there from should serve all nations.⁴⁸ In fact, however, the common heritage of mankind principle is vital to the protection of both the international seabed and Antarctica and is an important mechanism to ensure the development of commercial use of outer space. Furthermore, we should also set up a feasible exploration system to explore the outer space. The Law of the Sea is again a good example to follow, and the international community should follow the same steps to further consider and make a management regime for outer space.⁴⁹

Fifth, the commercial use of outer space also provides challenges for the protection of the outer space environment. The huge potential for profits in space will continue to support commercial space exploration. One unfortunate result of this will be the increased pollution of the space environment in the form of space debris. There are particular characteristics to damage to the space environment. On the one hand, the environmental damage, whether in the low earth orbit, the geostationary orbit, or the farther reaches of space is damage to the common heritage of all mankind, and thus not subject to any state's sovereignty jurisdiction.⁵⁰ On the other hand, there are a variety of general and space-specific types of harm, including radioactivity, [] and restrictions on the use of space caused by space debris. Due to the particularity of space environment damage, existing international environmental law does not cover the space environment, although some regulations exist within the UN treaty system.⁵¹

Thus, an international legal system protecting the space environment remains to be constructed. A first step was made with the formulation of the Inter-Agency Debris Coordination Committee (IADC) Space Debris Mitigation Guidelines on October 15, 2002.⁵² The UNCOPUOS also followed suit, adopting its Space Debris Mitigation Guidelines in 2007. These two guidelines are vital entry point to regulating a growing problem, indicating that the world has recognized the importance of protecting the space environment. But both documents fall short of providing formal legal protection. The international community should take a step in this direction.

V. CONCLUSION

With the development of space technology, the uses of outer space including space tourism, space launch, remote sensing, satellite communications, space experimentation and the exploitation of space resources, have demonstrated a consistent shift towards commercialization. These patterns, along with the

⁴⁸ Leo B. Malagar & Marlo Apalisok Magdoza-Malagar, "International Law of Outer Space and the Protection of Intellectual Property Rights" (1999) 17 B.U. INT'L L. J. 311 at 343.

⁴⁹ Grier C. Raclin, "From Ice to Ether: The Adoption of a Regime to Govern Resource Exploitation in Outer Space" (1986) 7 Nw. J. Int'l L. & Bus. 727 AT 739 (1986).

⁵⁰ Liang Xi, *International Law*, 2nd ed. (Wuhan: Wuhan University Press, 2000) at 240-244.

⁵¹ *Outer Space Treaty*, *supra* note 15, art. 9; *Moon Agreement*, *supra* note 15, art. 7; 1992 Principles Relevant to the Use of Nuclear Power Sources In Outer Space

⁵² IADC Space Debris Mitigation Guidelines (IADC-02-01, 15 October 2002), online: <<http://www.spacelaw.olemiss.edu/library/space/IntOrg/IADC/IADC-%2002-01%20-%20IADC%20Space%20Debris%20Mitigation%20Guidelines.pdf>>.

simultaneous developments in privatization and militarization of outer space, have continued to develop together over the past five decades. The international legal bases supporting these trends are contained in a series of international space treaties, documents, international practices, multilateral and bilateral conventions. Within the realm of individual state practice, the main sources of law are domestic legislation.

With continued developments in the privatization and commercialization of outer space, existing space law principles, in particular the liability regime and the registration system, face great challenges. International space law needs to be improved to facilitate the commercialization and privatization of outer space. To that end, legal instruments facilitating the commercial use of remote sensing technologies, the ISS, space tourism and space resources exploration, the intellectual property rights regime in outer space, the regime protecting the space environment and the regime for space resource exploitation should continue to be studied, debated and adjusted to bring the power of private enterprise to space.

LAW GOVERNING THE FINANCING OF TELECOMMUNICATION SATELLITES: A REVIEW OF THE CAPE TOWN CONVENTION

Dr. Sandeepa Bhat B.*

Abstract: The growth of telecommunication satellite operations in the recent past meant the need to turn from public to private modes of finance. Private finance relies on the balancing of risk and return. Due to the magnitude of risk involved, asset-backed modes of finance using the purchased asset as collateral gained importance to minimize the financier's risk. Because of the specific nature of space assets, however, financiers face particular problems in securing the asset. To remedy this, UNIDROIT has developed a two-tiered system – the Cape Town Convention and its Aircraft, Rolling Stock and Draft Space Protocols – to create an international system for particular asset types that easily transgress jurisdictional boundaries. This paper evaluates the Cape Town Convention and its Draft Space Protocol. It does so by presenting the primary mechanisms introduced through the system before critically evaluating both its internal inconsistencies and its conflicts with the UN space law treaty system.

I. INTRODUCTION

The development of commercially profitable telecommunication satellites resulted in the entry of the private sector into the then state-oriented space activities. The shift from a state-oriented space industry to a commerce-oriented private space industry necessitated substantial changes in the traditional modes of financing, since private sector capital flows primarily depend on the estimation of risks and returns. One of the major hurdles in the way of promoting private participation in the space telecommunication industry was the heavy risk involved in space activities. There is not only a risk of failed missions but also that of the debtor resorting to the stoppage of missions in order to prevent an operative loss and thereby hampering the creditor's interests. The system of asset-based financing, which uses the asset being financed as collateral and thereby assures creditors the return of their investment, made inroads particularly rapidly into the space industry especially to negate the latter category of risks involved in the space financing. For the huge investments required for space activities, this was found highly conducive and promising.

Despite this, the shortage of private sector funding for the space activities continues, primarily due to the divergence of laws relating to financing in different countries. The efficacy of the security very much depends on the willingness of the applicable legal regime to recognize the rights of the secured party when they come into conflict with competing claims. To strengthen the confidence of creditors in investing in space activities, it was necessary to unify the domestic laws relating to financing and to provide creditors with the assurance of adequate remedies. . The International Institute for the Unification of Private Law (UNIDROIT) took up the cause of unification of the domestic finance laws and evolved a novel two-tier system

* LL.M., Ph.D. Assistant Professor of Law and Coordinator - Society for Studies in Outer Space Law, The WB National University of Juridical Sciences, Salt Lake, Kolkata, INDIA. Member, International Institute of Space Law (IISL), France. E-mail: sandeep_nls@yahoo.com

consisting of a base convention, entered at Cape Town,¹ and area specific protocols to address the issue of protecting the interests of creditors of mobile equipment, which includes the space assets. Under the Cape Town system, the financing of space activities is intended to be governed by the provisions of the Cape Town Convention supplemented by the Space Protocol,² which is yet to enter into force. Though these two instruments undoubtedly represent one of the most ambitious and imaginative private commercial law projects ever undertaken, they are not free from loopholes. This is evident from the fact that while the other two protocols to the Cape Town Convention have come into force, the Draft Space Protocol is still being debated and has not come into force.

In light of these factors, the author will address the issue of financing telecommunication satellites in four parts. The first part of the paper addresses the positive attempt made by UNIDROIT in building creditors' confidence in financing more and more private space activities. The focal point of discussion in this part is the creation of an international interest, the registration of that international interest, rules of priority, default remedies and the insolvency proceedings provided under the Cape Town Convention and the Draft Space Protocol. The second part would critically view the substance of the two documents and point out the loopholes existing therein, including an overly complicated system of declarations, failure to address the transferability of licenses, the system's failure to recognize the principle of good faith, practical difficulties in exercising remedies provided under the system and the failure to address the issue of lenders' liability. The third part of the paper is devoted to the discussion on the possible conflicts between the Cape Town Convention and the major space treaties like the Outer Space Treaty, the Liability Convention, the Registration Convention and the Rescue and Return Agreement. The conflicts addressed herein basically relate to jurisdiction and control, questions of liability for private space activities, conflicts relating to registration, and dilemmas surrounding the rescue and return of space objects. Finally, the last part will sum up the arguments and provide suggestions for plugging the loopholes that exist in the Cape Town Convention and the Draft Space Protocol.

II. THE CAPE TOWN APPROACH TO THE SATELLITE FINANCING

The wide scale increase in commercial space activities requires huge amounts of private sector financing. However, the risks involved in private space activities and the uncertainties in the municipal legal regimes applicable to private space financing hamper the free flow of funding from the private sector. Keeping these legal uncertainties in mind, the UNIDROIT made a novel attempt to unify the municipal finance laws in the form of a base Convention, entered at Cape Town, and area specific protocols. The Cape Town system is intended to deal with the financing of mobile equipment, which can move from one jurisdiction to another. Since satellites are classified as mobile equipment, they are covered within the scope of the Cape Town system. Though the Space Protocol is still in its draft stages and therefore the Cape Town system is yet to come into force in the field of space assets, it is important

¹ *Convention on International Interests in Mobile Equipment, done at Cape Town, 16 November 2001 [Cape Town Convention]*.

² *Convention on International Interests in Mobile Equipment: Preliminary Draft Protocol on Matters Specific to Space Assets [Space Protocol]*.

to discuss the relevance of the Cape Town system, especially to plug the existing loopholes.

The Cape Town Convention and its Draft Space Protocol are based on the principle that a sound legal framework that facilitates the creation, perfection and enforcement of security interests would provide confidence to lenders and institutional investors both within and outside the states, making it easier to attract domestic and foreign capital.³ In order to fulfill this principle and to reduce the risks faced by creditors, the Cape Town Convention and its Space Protocol attempt to create an internationally applicable legal regime for security, title-retention and leasing interests within each industry. The regime is expected to facilitate the international trade in space assets, expand financing opportunities and lower the cost of financing.⁴

To start with, the Cape Town system discards the *lex situs* regarding security rights in tangible movables. The traditional rule of *lex situs* creates problems in mobile equipment like satellites, since the creditors would be unaware of the applicable law at various points of time. This legal uncertainty acts as a deterrent to creditors. Therefore the Cape Town system gives freedom to the parties to choose the law governing their contractual rights and obligations, wholly or in part.⁵ In addition, jurisdiction over any claim brought under the Convention is also given to the courts of a Contracting States chosen by the parties.⁶

The international interest and the prospective international interest in space assets are the unique creation of the Cape Town system, which are to be registered in the Internet Registry provided by the system.⁷ The registration serves the purpose of giving public notice of the interest as well as providing the basis for determining the priority among the competing interests. However, as it is not proof of the fact that the interest registered is validly created, one must go through the applicable law to determine the validity of the interest. The priority is determined according to registration irrespective of the fact that the holder of a registered interest had knowledge of a pre-existing unregistered interest at the time of registration. This provision obviates the possibility of challenging the registered interest on the basis of any pre-existing unregistered interest.

The Cape Town system recognizes that creditors always look for the availability of adequate and promptly enforceable remedies in case of default. Therefore, a range of standard remedies are set out along with a simple procedure to exercise those remedies. The Cape Town system also breaks new ground in laying down a set of substantive rules governing the speedy relief pending final determination of the claim. Another striking feature of the Cape Town system is the availability of the remedies during the insolvency of the debtor.⁸ While most national laws favour the insolvent debtor, the Cape Town system favours the creditor even in case of insolvency by allowing them to exercise either of the alternative remedies provided under the Space Protocol and adopted by the States Parties.

³ UNIDROIT, “International Interests in Mobile Equipment – Study LXXII”, online: <<http://www.unidroit.org/english/workprogramme/study072/main.htm>>.

⁴ Paul B. Larsen, “Space Asset Financing and Trade Issues” in *Proceedings of the Forty-sixth Colloquium on the Law of Outer Space, 29 September - 3 October 2003* (2004) 228 at 228.

⁵ *Space Protocol*, *supra* note 2, art. VIII (2).

⁶ *Cape Town Convention*, *supra* note 1, art. 42 (1).

⁷ *Ibid.*, art. 16 (1).

⁸ *Space Protocol*, *supra* note 2, art. XI.

III. LOOPHOLES IN THE CAPE TOWN SYSTEM

A. Failure to Recognise the Unique Nature of Satellites

The Cape Town system has failed to recognize the distinctive nature of satellites as mobile equipment. The railway rolling stock and aircraft equipment, when crossing national boundaries, subject themselves to different legal systems depending upon their location. Such movement also results in the change of jurisdiction. However, satellites, post launch, have a unique character of location in outer space, which is not subject to the sovereignty of any state. Under the Outer Space Treaty, satellites, when in orbit, continue to be under the jurisdiction and control of the state of registry.⁹ Therefore the likelihood of conflicting jurisdiction and applicable law is very low. In other words, the Cape Town system would be of limited importance in its application to satellite financing except during the launch and prior to the launch of satellites. Moreover, due to the unique nature of satellites, clubbing them with the railway rolling stock and aircraft equipment to establish one single international regime appears to be improper.

B. Complicated System of Declarations

There is no scope for reservation to the provisions of the Cape Town system. But it includes a complicated system of opt-in, opt-out, mandatory and other declarations. These declarations are enough to undermine the overall effectiveness of the system. It is the result of clubbing of mobile equipment possessing different characters in order to have a uniform system. The declarations that can be made by the states at different stages (ratification, acceptance, approval, accession or even afterwards) are left entirely at the discretion of the states. These declarations are also susceptible to modification or replacement by subsequent declarations. This subjects the creditors and the debtors to the cumbersome obligation of keeping track of all declarations as well as modifications of declarations. Thus the very problem of legal uncertainty surrounding financing, which the Cape Town system wanted to eliminate, would continue to exist, since the uncertainties remain as to the creditor and debtor's rights over the period of time depending on each state's declarations. Though the provisions relating to such declaration are incorporated with the purpose of obviating the problem of non-acceptance of the instruments by the states to protect their self-interest, it results in compromising the system's basic objective of creating an investor-friendly environment. *In toto*, a very complicated legal framework, which is not easily comprehensible by the public in general, has resulted out of the attempt to unify the law relating to different mobile equipment.

C. Failure to Address the Issue of Transferability of Licenses and Permits

The Cape Town system does not contain a system for licensing or granting permits for the space activities. VI of the Outer Space Treaty requires states to supervise the space activities of their nationals and are responsible for any damage caused by the

⁹ *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, done in London, Moscow and Washington, D.C., 27 January 1967, art. VII [Outer Space Treaty].*

private space activities.¹⁰ So the obligation of governmental supervision is carried out through national licensing procedures. An issue that requires special attention in the area of licensing is the possibility of transferring a license or permit.

Article I (2)(f) of the Draft Space Protocol states that the 'related rights' includes any permit, license, authorization, concession or equivalent instrument that is granted or issued by, or pursuant to the authority of national or intergovernmental or other international body or authority to manufacture, launch, control, use or operate a space asset, relating to the use of orbits positions and the transmission, emission or reception of electromagnetic signals to and from a space asset.¹¹ Article II of the Space Protocol provides for the application of the Convention and the Space Protocol to the space assets and the related rights, without determining whether related rights are transferable or assignable.¹²

This raises questions as to the transferability of a national license or permit. In most countries, licenses or permits are limited to a specific operator and they are not subject to transfer. For example, in United States, anyone launching space object must obtain a license from the office of Commercial Space Transportation of the Department of Transportation (OCST).¹³ This license is not freely transferable: the OCST must approve every transfer. Therefore upon default, the creditor is only entitled to the possession of space property and not the associated rights and licenses. However, transferability of licenses is most desirable from the creditor's point of view so that they can exercise their remedies freely. The non-transferability diminishes the value of space objects as collateral. Therefore it is necessary that either the Draft Space Protocol or the national space legislation must provide for the transfer of licenses and permits. The possibility of an easy license and permit transfer system would lead to cost reduction in the financial sector and hence to lower interest rates, which would be beneficial for operators and manufacturers.

D. Absence of Lenders' Liability

The concept of lenders' liability is one of the developments of mid 1980's. The concept makes the lender liable for various activities on the basis of the principle of equity. Though the Cape Town system recognizes lenders' liability for any breach of agreement relating to space assets,¹⁴ it fails to recognize the liability of the lender in various other fields. One of the prominent fields is the liability of the creditor for environmental damage. The lenders' liability for environmental damage in the situation where the lender is found to be in control of the borrower or in a position to affect the decisions of the borrower is well established in the United States.¹⁵ As the lenders in the case of space activities can control the debtor's venture through the tools of finance, it seems possible to make lenders liable for environmental damage caused by the space activities. This brings forward the question of whether the lenders can intervene in the debtor's venture and ask for environmental audits and clean up measures? Due to the absence of clear provisions to this effect, the lenders will be put under the dilemma as to their position in case of any damage to the environment. This

¹⁰ *Ibid.*, art. VI.

¹¹ *Ibid.*, art. I(2)(f).

¹² *Ibid.*, art. II.

¹³ 49 U.S.C. s. 70104.

¹⁴ *Space Protocol*, *supra* note 2, art. XV (2).

¹⁵ See *United States v Maryland Bank & Trust Co.*, 632 F. Supp 573 (D Md 1986). See also *United States v Fleet Factors Corp.*, 901 F. 2d 1550 (11th Cir 1990).

compels the lenders to go for costly lender liability insurance,¹⁶ which in turn adversely affects the financing of space activities.

The Cape Town system is also silent about the lenders' liability for inappropriately handling the collateral after the default. It fails to enumerate the consequences of the failure of the lender to follow the procedure in the exercise of remedies. A question for consideration is, whether the lender can take a decision to stop a particular service or destroy the satellite to prevent operating losses? As interest of nation is involved in most of the satellite services, allowing the creditors to take such steps may prove to be a costly affair. Fixing liability on the lenders for such acts needs to be incorporated in the Cape Town system.

E. Non-recognition of the Principle of Good Faith

The principle of good faith is an important general principle of law recognized by civilized states.¹⁷ But the Cape Town system fails to recognize the good faith of the parties in the registration of their interests. Under the system, an unregistered interest can by no means take priority over a subsequent registered interest. This rule is applicable even though the holder of registered interest had the actual knowledge of a pre-existing unregistered interest at the time of registration. It means that the good faith of the acquirer of the registered interest is irrelevant in determining the priority. Though this rule is favored to avoid the factual disputes as to the knowledge of the parties regarding earlier interests, it might deprive the rights of an interest holder who had no real opportunity to register his interest. Therefore the rule of priority under the Cape Town system is not in conformity with the general principles of law. In addition, it also seems to contravene Article 60 of the UNIDROIT Principles of International Commercial Contracts, which expects the parties to the contract to abide by the principle of good faith.¹⁸

F. Difficulties in Exercising Remedies

The Cape Town system empowers the creditors to exercise remedies such as taking possession or control of the objects and selling or leasing them. But these remedies are quite impracticable when applied to space assets. It is difficult to seize property that is in orbit.¹⁹ Moreover, the creditor is also obligated to maintain the satellite even after the default in order to prevent dangerous or environmentally unsound conditions.²⁰ The act of taking possession of space asset is generally done by the formal act of seizure of assets and control facilities located on the earth. But this is also subject to many difficulties. The creditors, not being the experts in conducting space activities, would not be able to handle the highly technological space ventures. Their small mistake may result in disastrous consequences. Such act of taking control

¹⁶ Richard Keppler and John A. Hannah, "Lenders and Environmental Liability" (September 2000), online: IRMI.com <<http://www.irmi.com/Expert/Articles/2000/Hannah09.aspx>>.

¹⁷ See *The Free Zones Case*, (1930) PCIL, SER. A, no. 24 at 12.

¹⁸ Zhang Yuqing and Huang Danhan, "The New Contract Law in the People's Republic of China and the UNIDROIT Principles of International Commercial Contracts: A Brief Comparison" (2000) 2 *Unif. L. Rev.* 429 at 435.

¹⁹ Stacey A. Davis, "Unifying the Final Frontier: Space Industry Financing Reform" (2001) 106 *Com. L. J.* 455.

²⁰ Joanne Irene Gabrynowicz, "Space Law: Its Cold War Origins and Challenges in the Era of Globalization" (2004) 37 *Suffolk U. L. Rev.* 1043

carries the risk of damage to the space object caused by the creditor's inappropriate action, taken by inexperienced or negligent personnel. The possibility of debtor's misusing the ignorance of creditors in the field of space technology also cannot be ruled out. Therefore, the exercise of remedies stipulated under the Cape Town system is entirely based on the debtor's cooperation. If the commercial space activities were to attract private financing, the remedies available to the creditors need to be strengthened.²¹

IV. THE CAPE TOWN SYSTEM *VIS-À-VIS* THE UN SPACE TREATIES

Though the UN space treaties seem to be outdated due to the advancement in space technology, they still continue to be the cornerstones of the international space law. This is manifest from the number of ratifications and signatures these treaties have succeeded in securing.²² In light of this, one of the issues that require special attention is the possible conflicts between the provisions of the Cape Town Convention and Space Protocol on the one hand and the major UN space treaties on the other hand. The following highlight some of the major areas of conflicts between the two.

A. Jurisdiction and Control

The provisions relating to jurisdiction and control under the Cape Town system are in direct conflict with the provisions of the Outer Space Treaty. Article VIII of the Outer Space Treaty states that “a State Party to the Treaty on whose register an object launched into outer space is carried *shall* retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body.”²³ But under Article 42 of the Cape Town Convention, the parties to a transaction are free to choose the forum in respect of any claim brought under the Convention, whether or not the chosen forum has any connection with the parties or transaction. Articles 43 and 44 of the Cape Town Convention further confer jurisdiction to the courts of the state on the territory of which the object is situated, debtor is situated and Registrar has its centre of administration to make different orders under the Convention.

In addition, in all the cases of transfer of ownership from the debtor to a foreign creditor consequent to default the moot question would be whether or not the state of registry retains jurisdiction and control over that space object after the transfer? It is important to note here that there is no provision in the space treaties providing for changes in the state of registration. If we look at Article VIII of the Outer Space Treaty, there is a mandatory obligation on the state of registry to retain jurisdiction and control.²⁴ But once the interest in the space object is transferred to foreign creditors, why the state of registry still retains this jurisdiction and control remains unanswered. So in the light of this conflict the possibility of transfer of

²¹ Martin J. Stanford and Bruno Poulain, “The Preliminary Draft Protocol to the Cape Town Convention on International Interests in Mobile Equipment on Matters Specific to Space Assets” (2003) VIII *Unif. L. Rev.* 664 at 667.

²² Rajeev Lochan, “Cape Town Convention and Space Protocol: A Critical Analysis” in V. Gopalakrishnan and Rajeev Lochan, eds., *Proceedings of ISRO - IISL Space Law Conference 2005*, (New Delhi: Allied Publishers Pvt. Ltd., 2006) 6-39 - at 6-44.

²³ *Outer Space Treaty*, *supra* note 9, art. VIII [*emphasis added*].

²⁴ Art. VIII uses the word state “*shall*” in describing a states obligation.

ownership of the space assets in orbit itself is questionable.²⁵ Though Hermida says that the transfer of satellite ownership in orbit is legally possible by an agreement among the launching state(s) to transfer all of the jurisdiction and control rights and other obligations in favor of a non-launching state,²⁶ it is quite complicated in practice.

B. Question of Liability

The interaction of the Cape Town system and the Liability Convention is also an area of possible difficulty. The Liability Convention fixes the liability for any damage caused by space activities on the launching state.²⁷ The 'launching state' is defined as a state, which launches or procures the launching of a space object or a state from whose territory or facility a space object is launched. In a COPUOS working paper of 2001 it was expressed that in case of the transfer of space objects to the creditors subject to the jurisdiction and control of another state, the launching state may no longer be able to exercise control over space objects.²⁸ The question of holding it liable in such cases was considered to be an area of possible conflict between the Cape Town system and the Liability Convention.²⁹ But this may not be so problematic, because in such cases the state to which the creditor belongs may be considered as the launching state since the launch is *procured* by the creditor. But the problem arises in the case of a sale of the space object by the creditors to a third person subject to the jurisdiction and control of a state totally unconnected with the launching of the space object. The state to which the purchaser belongs cannot be considered as launching state, as it does not come within the ambit of the definition. In such a situation, holding the launching state still liable would be unjustifiable.

Conflict between the Liability Convention and the Cape Town system may also arise if the creditor's state is not a party to the Liability Convention. As mentioned above, when the space asset is transferred to the creditor due to default, the state to which the creditor belongs attains the status of launching state. In case of a mishap, the state of the creditor has to bear liability under the Liability Convention. But if the creditor's state is not a party to the Liability Convention, the rights of the state which suffers damage and seeks compensation would be severely limited. So it is necessary to build measures to ensure the protection of the rights of the state that suffers damage and to ensure that the state of the creditor assumes the obligations in such cases.³⁰

C. Systems of Registration

The Registration Convention and the Cape Town system provide for parallel systems of registration consisting of conflicting provisions. Questions have arisen as to the interaction of the UN registry under the Registration Convention with the Cape Town system registry, and also as to the possibility of states incurring an obligation to

²⁵ J. Hermida, "Transfer of Satellites in Orbit: An International Law Approach" in *Proceedings of the Forty-fifth Colloquium on the Law of Outer Space* (2003).

²⁶ *Ibid.*

²⁷ *Convention on International Liability for Damage Caused by Space Objects, done in London, Moscow and Washington, D.C., 29 March 1972, art. II, III & IV.*

²⁸ UN Doc. A/AC.105/C.2/L.225 (23 January 2001).

²⁹ *Ibid.*

³⁰ *Supra* note 22, 6-47.

register a space asset in the national and UN registries under the Registration Convention due to the activities of creditors and/or debtors pursuant to the provisions under Cape Town system.

Paul B. Larsen, while asserting that there is no conflict between the Cape Town system and the space treaties, states that the parallel system of registration is required to serve two different purposes.³¹ Despite the fact that the parallel systems of registration serve two different purposes, they cannot function entirely independent of each other. Though the Cape Town system registry concerns financing space ventures and protecting the interests of investors, and not with the regulation of ownership, the change in the ownership of the space asset may take place as a remedy to a breach of contract. As mentioned earlier, a change in ownership might affect the rights of the state of registry under the Registration Convention. Therefore, Brazil was of the view that the question of transfer of space assets is the central issue to be solved in relationship between the Registration Convention and the Space Protocol. It also asserted that the UN registry established under the Registration Convention is the general and superior register of all objects launched into outer space.³² Therefore, the legality of transfer of ownership of the space assets itself becomes questionable, since it alters the rights of state of registry under the Registration Convention.

D. Return of Lost Space Objects

The Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space contains provisions for the return of lost space objects to the launching state. Specifically, Article 5(3) provides that:

Upon request of the launching authority, objects launched into outer space or their component parts found beyond the territorial limits of the launching authority shall be returned to or held at the disposal of representatives of the launching authority, which shall, upon request, furnish identifying data prior to their return.

In a situation of transfer of possession or control of the space assets due to sale under the Cape Town system to a third party in a state other than the launching state, there would be little incentive for the launching authority to demand the return of a space object. Because the launching authority cannot retain such objects and would be under an obligation to return them to the person entitled to possession in accordance with the Cape Town system, it would not be bothered to make a request for the return of lost objects. This affects the rights of the purchaser of the space assets.

Thus, there are conflicting provisions in the Cape Town system and the UN space treaties. The Draft Space Protocol tries to remedy this defect by the provisions in the Preamble and Article XXI *bis*. The Preamble of the Space Protocol recognizes the importance of established principles of space law, including those contained in the international space treaties under the auspices of the United Nations.³³ After an

³¹ Paul B. Larsen, "UNIDROIT Space Protocol: Comments on the Relationship Between the Protocol and Existing International Space Law" in *Proceedings of the Forty-fourth Colloquium on the Law of Outer Space, 1-5 October 2001* (2002) 187 at 188.

³² A. Fabricio dos Santos, "Developing Countries and the UNIDROIT Protocol on Space Property" in *Proceedings of the Forty-fourth Colloquium on the Law of Outer Space, 1-5 October 2001* (2002).

³³ *Space Protocol*, *supra* note 2, Preamble.

intense debate during the first session of the UNIDROIT Committee of Governmental Experts held in Rome during 15 - 19 December 2003, Article XXI *bis* was added to the Space Protocol to highlight the importance of the space treaties.³⁴ It states that the Convention as applied to space assets does not affect State Party rights and obligations under the existing United Nations Outer Space Treaties or instruments of the International Telecommunication Union. The provision only speaks about supremacy of the space treaties over the Convention. But it fails to mention the status of the Draft Space Protocol in clear terms. The mere mentioning of “mindfulness” in the preambular section is not sufficient. Therefore the superiority of the space treaties over the Cape Town system needs to be asserted more forcefully in the operative section.

V. CONCLUSION

Undoubtedly, the Cape Town system is one of the most important achievements in the history of financing space activities. However, the aforesaid loopholes have the effect of overshadowing the significance of the entire system. Therefore, there is a need to introduce substantial changes in the system before adopting it. At the outset, there is a need to remove the difficulties involved in the two-tier structure adopted by the Cape Town system by way of enacting a separate convention for each type of mobile equipment. This would avoid the complexity and fragmentation of the law as well as the complicated system of declarations. The equipment specific convention would be more user friendly and helps in building confidence in the minds of creditors, as they would be aware of their rights. In addition, the transfer of licenses and permits should not be left to be governed by the conflicting national laws, since the absence of transferability of licenses and permits makes the remedies available to the creditors under the Cape Town system meaningless. There is also a need to formally recognize the importance of the principles of lenders’ liability and good faith of the creditors in the Cape Town system. Though the system carries the objective of creating the creditor-friendly atmosphere, it is unreasonable to cause imbalance in the system of financing by allowing the creditors to dictate terms. As any successful system of financing needs to take care of the interests of both the parties, the interest of debtors should not be allowed to be suppressed by the creditors.

Apart from plugging the above loopholes, there is a need to bridge the gap between the Cape Town system and the space treaties by responding to the fact that the space treaties are entered long back and that the modern developments in the field of space technology and system of financing need a new approach relating to jurisdiction, control and liability. Though the basic features of the space treaties ought to be continued, necessary changes to make them effective should be introduced. Provision of the Outer Space Treaty relating to retention of jurisdiction and control of the space object by the state of registry needs to be amended to do away with the problems in the cases of transfer of satellites to non-launching states. The problems relating to liability, registration and return of space objects can be solved by attributing the launch of satellites to the individuals concerned rather than to their respective states. Such attribution would vest all rights and obligations relating to satellites with the individuals, which can be transferred through contract during the transfer of satellites.

³⁴ *Ibid.*, art. XXI *bis*.

INDUSTRY'S POTENTIAL, PLAYER'S SOPHISTRY AND REGULATOR'S OVERSIGHT: PERSPECTIVES ON TELECOMMUNICATION SATELLITE OPERATIONS IN INDIA BY FOREIGN COMPANIES

Ketan Mukhija

Abstract: India has recently witnessed a tremendous progress in the realm of international communications, spearheaded by the Ministry of Communications through the Department of Telecommunication. The paper critically analyses the various strategies in respect of entry of foreign/non-resident corporates into India for provision of telecommunication satellite services, and conduct of related activities. Currently, Foreign Satellite Operators (FSOs) may enter the satellite services market in India in one of two ways: through an agreement to provide services through ISRO or by establishing an independent corporate presence in India. Based on the contextual analysis of the foregoing, the paper shall attempt to address certain serious concerns that have recently emerged in the wake of Antrix-Devas Multimedia deal, over misuse of such powers of the regulatory authorities. In addition, the paper will seek to discuss the allied general questions from a legal/ regulatory perspective, namely; threat to national security, launching of private satellites, licensing of the private partners, FDI in the space industry, inter-departmental coordination and conflict resolutions, among others. We are aware that despite all the positive developments in the field of technology, India has been a laggard behind in restructuring its legal framework to respond to the consequential issues, concerns and challenges; accordingly, the paper will further propose the imperative for a comprehensive domestic legislative framework for effective regulation of relevant issues at hand

I. INTRODUCTION

The international environment for space activity has undergone a sea of change in the past two decades or so. Originally started for reconnaissance during the Cold War period, space activities have now percolated into just about every other welfare activity. Needless to say, the processes of commercialization and privatization have followed and altered the very course of such activities. During the last two decades, increasing emphasis on reducing governmental budgets worldwide has forced the world's space faring nations to reassess their civil space programs. Such action requires establishing close working arrangements between government and the private industries which facilitate, *e.g.*, satellite communications, navigation and position location, remote sensing, data processing, support services and infrastructure. Developing countries like India are more hard-pressed to allocate funds for these activities. Therefore the need for privatization of space activities deserves the maximum attention in countries like India, which need these activities even more than their richer counterparts for their national development. A mutually rewarding partnership between the Indian space programme and industry has been built over the past two decades, which brought about a sense of appreciation and confidence from the private sector.

Associate, P&A Law Offices (Associate firm of Jones Day), New Delhi, India.

India's efforts in ensuring the peaceful use of outer space bore fruit with the signing of the Space Treaty in 1967, which relates to the concept of freedom of outer space with corresponding international responsibility, co-operation, and the principle of non-appropriation. India's contribution to the evolution of the Liability Convention of 1972 is quite significant. Some of the aspects mentioned in the convention were first brought forth at the 1969 New Delhi Conference of the legal subcommittee, popularly known as 'New-Delhi Principles': the liability of international organizations for nuclear damage, the legal limitations of financial liability, and compulsory third party arbitration. In the Moon Agreement of 1979, India emphasized the need to ensure the exploitation of natural resources of the Moon and other celestial bodies in an orderly and rational manner. To achieve this objective, India argued for the creation of an international legal regime, which should ensure that as the common heritage of mankind such resources were exploited for the benefit of mankind. Moreover, India has not only taken active part in the UN-COPUOS by evolving the above treaties but also made every effort in the elaboration of the five United Nations General Assembly resolutions.

A. India's Contribution

With the proliferation of space activities, the international community has realised the importance of formulating international rules and regulations for the conduct of human activities in outer space. Since the successful launch of Sputnik-I by the former Soviet Union on October 4, 1957 – marking the dawn of space age – since then the governments and their organizations have been the major driving force behind new developments in space. Now industry and private ventures are becoming more important players in the space sector.

As is well known COPUOS has become a permanent committee and has taken several important steps to promote a systematic and orderly growth of international space activities¹. The committee carried out several scientific, technical, economic and social studies on space technology and its applications. It has organised three United Nations conferences on the exploration and peaceful uses of outer space – the UNISPACE 1968, UNISPACE 1982, and UNISPACE 1999. India, a member of COPUOS, has since its inception played an important role in the evolution and execution of its activities.² Professor Yashpal initiated a programme called “the Sharing of Experiences in Space” (“SHARES”), under which several developing countries have since benefited from training facilities in space applications – remote sensing, communications,³ the production of video/television programmes for education and satellite technology; joint experiments on Indian rockets, satellites and

¹ See generally Kim Alaine Rathman, “Sharing the Harvest of the Skies: Outer Space Commercialization and Third World Development” (1998) 3:4 Soc’y for Phil. & Tech., online: <<http://scholar.lib.vt.edu/ejournals/SPT/v3n4/rathman.html>>.

² See UN-UNESCO Panel Meeting on SITE Experiences, Oct 31-Nov 5, 1997 (Space Application Center, Ahmedabad) at 1-15

³ Communication satellite is equipped with a number of receive and (re) transmit units, so called transponders. It receives transmissions from earth stations, which is called the ‘uplink’ and sends them down to an earth station, which is called the ‘downlink’. Downlink transmissions are sent on a different frequency than uplink transmissions because otherwise interferences would occur.

balloons; exchange of scientists and engineers for specific system studies, and consultations – offered by India.⁴

Moreover, in the late 1980s Professor U.R. Rao of India proposed a major co-operative space mission – “Protection of the Environment for assuring a Clean Earth” (“PEACE”) – to the international space communities for resolving the problems and concerns of the global environment. It offered considerable scope for extending multilateral co-operation, involving the participation of many developed and developing countries. Thus, we see that India has played a substantial role in the formulation of international space law and policy to date.

India, as the representative of the third world, has voiced strong opinions on issues spanning various aspects of space legislation and policy. India has emphasised the need to check the negative use or impact of space technology. In its opinion, direct broadcasting satellites should cover political, cultural, social and commercial aspects under a proper legal framework. It proposed the use of natural resources of the Moon for the purpose of exploration.

India also proposed the setting up of an international remote-sensing system, which would act as an Umbrella for all the national ground stations. In this context, it proposed the sharing and dissemination of information. India proposed a discussion on scientific lines on the use of nuclear resources in outer space. Legal provisions in India are not yet specific enough to provide protection to its highly active remote sensing programme. The legal provisions at best support a stretch-fit exercise, stretching the available legal provisions to fit the required level of protection.

At this juncture, it would be useful to acquaint ourselves with the protection system followed at Indian Space Research Organization (ISRO) with respect to remote sensing data supply enabled through its remote sensing satellite constellations.⁵ Data protection is achieved through technical as well as legal means. Technically, the supply of data reception at a foreign ground station is controlled, or rather authorised, by ISRO on a case to case basis. The nature of the requirements, such as the area of coverage sought and sensitivity attachments if any, are taken into account while processing the request from a foreign station. Upon establishing satisfactory justifications, only images of the required area are covered by the onboard cameras operated on commands from its satellite control centre and at the same time the respective end use ground stations are authorised to receive the imageries, which again are equipped with customised ground equipment supplied by ISRO. Thus a basic system of protection is maintained through such screening mechanism.

Legally suitable clauses for data privacy rights are included in the agreements with buyers/partners. While we do have a Remote Sensing Data Policy in place,⁶ it is interesting to note that the Remote Sensing Data Policy does not address issues of intellectual property rights (IPR), as it is intended for different purpose – namely, to assess the user’s requirements, the end use, justifications and so on. As regards the

⁴ U.R. Rao, “Space for Sustainable Development” in V.S. Mani, S. Bhatt, V.B. Reddy, eds., *Recent Trends in International Space Law and Policy* (Delhi: Lancers Books, 1997) 27.

⁵ Informatively suggested by Dr. Rajeev Lochan, Assistant Scientific Secretary, ISRO and communicated by Mr. V. Gopalakrishnan, Scientist/Engineer, ISRO.

⁶ See Vasundhara Raje, Minister of State in the Department of Atomic Energy and Department of Space, Statement in the Lok Sabha regarding “Remote Sensing Data Policy” (8 August 2001).

IPR policy, it is addressed in the agreement to be signed for obtaining remote sensing data from the National Remote Sensing Agency (NRSA), Hyderabad.⁷

A strong copyright regime in the country should be stressed. The Copyright Act should be amended to include provisions specific to remote sensing activities. The international experience seems to support this observation. Another alternative would be the enactment of a comprehensive space legislation which could have a specific part on protection of remote sensing data and images, stressing the fundamental importance of the definition and delimitation of outer space in order to eliminate the ambiguity concerning the sovereignty of the states. India consistently favours an equitable access to and rational utilization of the geostationary orbit. It has also voiced its concern for a comprehensive international action plan to stall the danger posed by space debris.⁸

II. THE ROAD AHEAD

Soon after the launch of Sputnik by the former USSR in the year 1957, India realized the huge potential of space science and technology for its overall development. To achieve this objective, the Indian space venture started from a humble beginning in the early 1960s, familiarizing itself with space and the required technologies. During the Seventies the effort was primarily geared towards carrying out research and development in a variety of scientific and engineering disciplines for launch vehicles and satellites.⁹ In the Eighties, the Indian space programme entered the operational stage to provide space services in communications, meteorology, and remote sensing and development of launch vehicles. In the Nineties, focus was on the launch of more ASLV and PSLV. With the launch of IRS-IB and INSAT 2A & 2B, the Indian space programme became fully operational through its own communication and remote-sensing satellites. In the New Millennium the effort has been on sending revolutionary GSLV and EDUSAT projects, which are but important milestones in India's ambition of sending a spaceship to the Moon. Today the Indian space programme has not only achieved considerable self-reliance in space technology for national development but it has also promoted its commercial utilization.

It is interesting to note that though signed by five countries including India and ratified by another ten, the Moon Treaty has not been signed by the US, the most important of all nations in this regard. It is also interesting to note that a company named 'Moon Estates' registered in UK and which advertises sale of land on Moon, Mars, Venus and other celestial bodies in the solar system. One of the logics given in their website, MoonEstates.com, for justifying the legality of sale is that, 'only nations' are bound by the OST and not individuals or Non-Governmental Organizations. So the Moon Treaty seems also an attempt by the UN to prevent private entities from

⁷ See NRSA Product Purchase Agreement, s. 4, online: <<http://www.nrsa.gov.in>> ("The customer acknowledges the copyrightable character of satellite data under the legislation and conventions concerning copyrights. Accordingly, the customer acknowledges the NRSA ownership (including ownership of copyright and intellectual property rights) of satellite data.")

⁸ V.A. Sarabhai, P.D., Bhavasar, EV Chitnis & P.R. Pisharoty, *The Application of Space Technology to Development* (United Nations, NY, 1973) at 10-11

⁹ Eric Morgan de Rivery, "Community Legal Framework for Satellite Communications: Certain Issues of Concern to the Industry" in *Proceedings of the 38th Colloquium on the Law of the Outer Space 2-6 October 1995* at 37.

exploiting space and other celestial bodies including the Moon for profit, as provided by the OST regime has not been signed by most of the nations, including space faring nations like the USA, UK, Russia and China.¹⁰

During the last two decades an increasing emphasis on reducing governmental budgets worldwide has forced the world's space faring nations to reassess their civil space programs. Such action requires establishing close working arrangements between government and private industry which facilitate, *inter alia*, satellite communications, navigation and position location, remote sensing, data processing, support services and infrastructure. Developing countries like India are more hard-pressed to allocate funds for these activities. Therefore the need for privatization of space activities deserves the maximum attention in countries like India, which need these activities even more than their richer counterparts for their national development. A mutually rewarding partnership between the Indian space programme and industry has been built over the past two decades, which brought about a sense of appreciation and confidence from the private sector.

The space application sector witnessed tremendous developments with the active involvement of the private sector. For example, there is a huge market to be tapped in India in the field of cable and satellite television. Doordarshan has already started their Direct to Home (DTH) venture. Technologies like DTH, DTT and Broadband are going to flourish in the near future in the vast Indian market. Recognizing the privatization and commercialization of space activities many, developed nations have drafted national space laws for various complex facets of space activities, including a core licensing system for private space activities. Thus, it is abundantly clear that even countries which are lagging far behind India in technological advancement have some sort of space law for their country which places them ahead of India in attracting cross border investments.

III. REGULATORY REGIME IN INDIA: AN OVERVIEW

India's present regulatory environment essentially requires providers of Indian domestic services (*i.e.*, up-linked from India, with intended coverage of India) such as DTH and VSAT services to use Indian National Satellite System (INSAT) satellites. India is a relatively mature satellite market, with its own domestic satellite operator, ISRO, which has been providing geostationary satellite services since 1982. Until the early 1990s, the Indian satellite market was dominated by INSAT and by Intelsat, which was then an international treaty organization, one of whose signatory was the then-Government of India (GoI) owned telephony carrier, Videsh Sanchar Nigam Limited.¹¹

In the field of international communications, India has made tremendous progress by using an extensive infrastructure of satellite earth stations, state-of-the-art digital gateways, optical fibre multi-media submarine cables and multi-media data switches. The telecommunications initiative in the country is led by Ministry of Communications through the Department of Telecommunication (DoT). This section

¹⁰ Commission of the European Communities, *Towards a Dynamic European Economy: Green Paper on the Development of the Common Market for Telecommunications Services and Equipment* (COM (87) 290 Final, 30 June 87).

¹¹ See "Science and Its Impact on Society-Indian Experience" in *Proceedings of the Seminar Organized by the National Science Academy, New Delhi, 22 & 23 Apr 1978* at 78.

attempts to critically analyze the various strategies in respect of entry of foreign or non-resident corporates into India for provision of telecommunication satellite services, and the conduct of related activities.

IV. PLAYER'S SOPHISTRY: ENTRY OPTIONS FOR FOREIGN SATELLITE OPERATORS IN INDIA

In the present state controlled telecom satellite operations in India, Foreign Satellite Operators (FSOs) have two entry options to establish its business and provide satellite services in India.

A. Providing Services through ISRO

FSOs can provide bandwidth capacity services to Indian customers, such as DTH and VSAT service providers, through ISRO. The approval process for using a non-Indian satellite or a foreign satellite by a DTH service provider involves the Department of Space (DoS), the Wireless Planning & Coordination wing of the DoT, and the Ministry of Information & Broadcasting. Preference is always given to INSAT satellites, which are operated by ISRO. In the instances where INSAT does not have sufficient in-orbit capacity available for any particular service, the lease of foreign satellite capacity is canalized through ISRO. The foreign satellite should be coordinated with INSAT satellites in terms of the International Telecommunication Union's (ITU) Radio Regulations as a pre-condition for lease of capacity. Approval, when granted, is in the form of a short term lease signed by ISRO or by its commercial arm, Antrix, with the Indian customer, and between Antrix and the FSOs, until INSAT is able to launch future additional capacity.¹² There is no privity of contract between the Indian customer and the FSOs, though the Indian customer and the FSOs agree on the commercial terms prior to approaching ISRO. The lease rentals for the provision of capacity to the Indian customer are generally decided by ISRO. Presently, several leases have been signed with foreign satellite operators by ISRO to cover shortfalls in transponder capacity including leases with Thailand's Thaicom for C-band capacity and with New Skies and SES Americom for Ku-band capacity.¹³

This method may give foreign operators immediate access to the Indian market with minimum capital requirements. However, this may not be helpful to meet the long-term requirements of the FSOs due to reasons such as a termination of the contract by ISRO or non-renewal of contract on expiry of the original term. The FSOs can instead enter in to a joint venture agreement with ISRO for developing, launching and operating a satellite jointly along with ISRO which would enable them to meet their long term objectives.

B. Establishment of an Indian Satellite System

FSOs can also make an entry directly into the telecom business in India, by independently setting up satellite systems in India. For setting up Indian satellite

¹² K. Kasturirangan, "Indian Space Technology: Poised to go Global", Indian Aviation –Civil & Military (Bombay, 1st July, 1994) at 21

¹³ Stewart White, Stephen Bate & Timothy Johnson, *Satellite Communications in Europe- Law and Regulation* 1994, (London: FT Law & Tax, 1994) at 181.

systems (ISS), the FSOs need to incorporate a new Company under the [Indian] Companies Act, 1956.

Doing so requires several conditions be met. Clearances and approvals are required as per the foreign investment policies in India for entry into the Indian market. Foreign direct investment (FDI) policy is regulated by the Foreign Exchange Management Act, 1999, and the Foreign Exchange Management (Transfer or Issue of Security by a person resident outside India) Regulations, 2000 (FEMA Regulations).¹⁴

Proposals which do not satisfy the said parameters prescribed for automatic approval require prior approval from the Foreign Investment Promotion Board (FIPB). The satellite company will need to submit a detailed application with the FIPB for obtaining its approval for foreign investment. The application would need to be supported by documents including the brochures and profiles of the satellite company or its affiliates, a business plan/project report, memorandum and association of articles of the new company (collectively, the Charter Documents).¹⁵ Once the FIPB approval has been obtained, the Indian company can directly receive funds through banks authorized to deal in foreign exchange and issue shares to foreign investor subject to submitting prescribed reports with the Reserve Bank of India (RBI) within 30 days from receipt of the share consideration amount and issue of shares to the foreign investors. After completing all these procedures, the company will then have to apply for other operating licenses and approvals including applying for applicable registrations under the [Indian] Income Tax Act, 1961, licenses under the Shops and Establishments Act, and other applicable documents to operate without any non-compliance and security threat issues.

V. POTENTIAL FOR REGULATORS' OVERSIGHT

The Antrix-Devas Multimedia deal and subsequent controversy has recently created a serious concern, and is a major drawback regarding this matter. Satellite communications in India are governed by the SatCom Policy of 1997, the guidelines for the implementation of which were issued on January 12, 2000. According to these regulations, the INSAT system capacity will be made available to private service providers on a commercial basis subject to its availability.¹⁶ The DoS is responsible for allocating this capacity. The DoS leases 'transponders' carried on satellites to service providers for carrying out their operations. Private service providers pay lease charges at the prevailing market price.

A. *Background to the Deal*

A contract was entered in to between Antrix and Devas Multimedia Private Limited for leasing to Devas 90 per cent of the space segment capacity on two geostationary satellites, GSAT-6 and GSAT-6A for 12 years on a 24x7 hour a week basis, which would use up the entire 70 MHz of the S-band available with ISRO (Agreement). The agreement was signed on January 28, 2005. The DoS got the Cabinet approval for the

¹⁴ V. Balakista Reddy, "Space Law & Space Policy in India" in Mani *et al.*, eds., *supra* note 4 at 132-139.

¹⁵ Department of Space, Govt. of India, *Annual Report, 1994-95* at 42-43.

¹⁶ ISRO, Press Release, "Norms, Guidelines and Procedures for Satellite Communications Announced" (8 May 2000), online: <http://www.isro.org/pressrelease/scripts/pressreleasein.aspx?May08_2000>.

building of GSAT-6 at a cost of INR 269 crore and GSAT-6A at a cost of INR 147 crore under the Commission's delegated powers.

Consequently, there were complaints about the manner in which the deal was entered into and the way in which it was being operationalized. It was found that in the approval process that there have been several serious violations of procedures laid down for any project by ISRO. For any project approval, the proposal is first placed before the Space Commission, which includes the Cabinet Secretary and a senior official, of the rank of Secretary, of the Ministry of Finance. On being cleared, it goes to the Cabinet for approval. In the case of the INSAT system of satellites, which has multiple users, the proposal goes to the INSAT Coordination Committee (ICC) to coordinate the allocation of transponders and frequencies and then to the Cabinet. There were also apprehensions that the government could face a heavy revenue loss owing to the deal. The matter came up before the Space Commission at a meeting on July 2, 2010 for the first time.¹⁷

B. Observations

The Committee came back with several observations. Specifically, it found that:

- In view of spectrum being a vital national resource and in view of the limited availability of S-band spectrum, and its need for meeting the emerging strategic and societal requirements, there was an imminent need to preserve S-band spectrum;
- Although the Agreement provided for Devas to hybrid (space plus terrestrial last mile) connectivity, the cost of spectrum had not been factored in the costing of the deal;
- The Agreement allowed the possibility of Devas moving towards 4G services in the process of accessing the terrestrial spectrum;
- Late delivery of the spacecraft and performance failures/service interruptions do not affect Devas' revenue;
- Taking into account the time value of (public) money put upfront by the Government, the estimated revenue did not appear to compensate for the investment cost by the DoS, and the cost of capital and the revenue shown in the Agreement had not taken into account the risk factor in developing the satellite and their in-orbit flawless operation for 12 years;
- The ICC mechanism be revived and Antrix functioning be restructured to ensure diligence of financial, contractual and legal aspects.¹⁸

Accordingly, the high-power panel directed the DoS to instruct Antrix to annul the contract on the ground that there was a tremendous increase in the demand for allocation of space-based spectrum for strategic needs and societal applications.

Now, the fundamental question that arises here is whether Antrix, ISRO and the Government of India, breached the contractual terms of the Agreement by scrapping the deal. The other related questions are: Who determined the cost of the

¹⁷ See Mohan Sundararajan, *Space Today* (New Delhi, 1992) at 61

¹⁸ Sandeep Joshi & P. Sunderarajan, "Antrix-Devas S-band deal headed for annulment" (8 February 2011), online: <<http://www.thehindu.com/news/national/article1168257.ece>>.

deal? On what basis was this determination made? Why was this deal signed with a 'private operator' in spite of knowing that S-band spectrum is very sensitive as they are used by the security agencies of our country? Why did the Government not interfere when the deal was signed five years ago? Why did the Space Commission review the deal after 5 years from the date of signing of this deal? Since foreign companies have invested in Devas Multimedia Private Limited, is it a back-door entry to foreign investments in a sector where foreign direct investment is not permitted in our country, leading to security threat? And hence leading us to wonder if the Government should strictly not permit private/ foreign companies to invest in such critical areas? Or should the Government enact more stringent laws to avoid such controversies in future?

To avoid such issues in the future, the Government needs to take immediate and necessary steps towards addressing this matter. Another drawback is the restrictions placed on the use of foreign satellite capacity for DTH services. India's Ministry of Information and Broadcasting (MIB) has established guidelines that establish a preference for Indian satellites to provide capacity for delivery of DTH subscription television services.¹⁹ While these guidelines do allow the use of foreign satellites if the foreign satellite has completed the international frequency coordination process with the domestic INSAT, in practice, authorized DTH licensees are not permitted to contract directly with foreign operators even if the frequency coordination has been completed. Instead, the foreign satellite capacity must be procured through the ISRO, the operator of the INSAT system. ISRO only permits such use if it does not have available capacity on its own system. If ISRO cannot meet the DTH requirement, the foreign satellite operator first must sell its capacity to ISRO, a direct competitor, who then resells it to the consumer, creating a middleman scenario where: (i) additional costs are created for the consumer through mark-ups by ISRO; (ii) ISRO may structure contracts with the goal (explicitly stated at times) of moving the service to one of ISRO's satellites once capacity is available; and (iii) ISRO determines the rate at which the market grows.

VI. CONCLUSIONS AND RECOMMENDATIONS

The lack of clarity regarding the role of the DoS is yet another drawback. India's DoT's New Telecom Policy of 1999 stated that users of transponder capacity would be able to access both domestic and foreign satellites, in consultation with the DoS, of which ISRO forms part.²⁰ While it might be necessary for the DoS to ensure that foreign satellites are completing international coordination agreements with the INSAT system, there are no technical or commercial reasons why foreign satellite capacity should need to be procured through DoS (ISRO), a direct competitor of foreign satellite operators. This 'middleman' role of DoS results in a competitive advantage for the domestic Indian satellite system. The Telecom Regulatory Authority of India has been consistently recommending for an 'open skies' policy for all satellite users. However, the Government has so far not accepted this recommendation.

¹⁹ Mukund Rao, V. Jayaraman and K. Sridhara Murthi, "Spatial Information – Rights and Privileges Perspectives" (2003) IAC-03-IISL.1.19

²⁰ V. Balakista Reddy, "Space4 Law & Space Policy In India" in Mani *et al.*, *supra* note 4 at 132-139.

The current policy of filling the gaps by renting foreign transponders on a short-term basis is not sustainable and will keep India at the mercy of the short-term market fluctuations and also severely limits an FSO's ability to offer Ku-band services to customers up linking from within India. Satellite services operating in the Ku-band frequency range remain banned for use of broadcasting to cable head ends. There is no technical or logical policy reason for this restriction, given that Ku-band capacity is just as suitable for video distribution as are other frequencies, such as C-band, that are currently approved for this application in India.²¹ This restriction should be removed. Foreign operators will not dedicate capacity to the Indian market if long term contracts are available elsewhere. A true 'open skies' policy should be adopted for the provision of satellite services in India. Local users in India should be allowed to contract directly with any satellite operator that has the ability to serve India, and not be constrained by regulatory policies that establish a 'preference' for a domestic operator or service provider. But the government at the same time needs to keep a check on the security issues before adopting open sky policy and such other policies.²²

Currently, there is no codified law governing licensing of communications satellite operators in India. ISRO is the only organisation associated with satellite operations in India and Antrix Corporation, its wholly owned commercial wing, markets the space products and services.²³

A. The Need for a National Space Legislation

India's contribution to the development of international space law is significant. In many aspects it has taken a holistic view of space, rather than merely its scientific aspects. Its stand on many issues like militarization of outer space, use of Direct Broadcasting Satellites (DBS) and Remote Sensing Principles are noteworthy. On the issue of the inequitable situation existing with regards to the geostationary orbit, India's stand has been on the equitable access and rational utilization of geostationary orbit. India has also voiced its concern for a comprehensive international action plan to stall the danger posed by space debris.

On the domestic front, space technology proliferation is going in a big way but there is no comprehensive or specific space law in India. Space and space-related matters have been regulated not by single comprehensive legislation but by legal rules belonging to different areas of the domestic law so far. However, the time has come now for the preparation of an appropriate legal framework, keeping in view the recent national and global developments—the active involvement of the private sector and commercialization of space activities, and the agreements made nationally and globally with various agencies, governments, international and intergovernmental organizations.

The matters related to the space activities of the Indian Government are under the overall responsibility of the Space Commission, which formulates guidelines and policies to promote the development and application of space science and technology. Hence there is an immediate need for a codified National Space Law for making its activities more focused and resourceful, as space has become a place that is

²¹ V.S.Mani, *Space Law and Policy for India-Projection of an Outline* at 51-56 [unpublished].

²² Patrick-Andre Salin, *Satellite Communications Regulations in the Early 21st Century-Changes for a New Era* (The Hague & Boston: Martinus Nijhoff Publishers, 2000) at 322.

²³ Avinash Singh, "India Needs Space TO Grow" *Hindustan Times* (New Delhi) (16 May 1994).

increasingly used by a host of nations, businesses, and entrepreneurs, and as space business operates beyond the sovereignty of national borders.²⁴ The law should focus on the commercial exploitation of various potential space business activities like space manufacturing, resources for space and earth, space business parks, satellite and space transfer services, travel and entertainment, *i.e.* space tourism, research and development in space; space transportation, space infrastructure, space solar power, as well as other areas of commercial application. The key provisions that are to be considered while framing a National Space Policy are:

- Developing and promoting space programs on internal and external security matters;
- Preserving and promoting international cooperation for peaceful exploration and use of space;
- Improving infrastructure for development and promotion of space education and research in India so that the qualified and technical space manpower achieves global acceptance, recognition and competitive edge;
- Framing guidelines on National Space Security matters;
- Framing guidelines on civil and commercial space matters;
- Resolving issues related to Orbital Debris and Nuclear race in space;
- Privatization of space business aimed at improving domestic and international competition;
- Creation of a specialized agency for promotion of Domestic and International space business;
- Framing broad guidelines on public safety and liability matters;
- Establishing a high-powered committee and study group for development of Space Law;
- Approving authorities to be made responsible for resolving issues arising out of such approvals;
- Reasons to be provided for approval or non-approval of any project/program, etc.;
- Increasing awareness of the growing importance of space business to public especially students to improve the standard of the existing laws.

A well-defined space law shall enable better capitalization and optimization of existing infrastructure and resources by promoting the orderly and organized growth of space business by providing recognition and legitimacy to ongoing space programs, providing opportunity to potential space operators both domestic and international, developing indigenous technology to match international standards, keeping a check on the misuse of space resources/utilities, and providing stringent punishment for violators of space law.

India's endeavor to achieve efficiency and transparency in spectrum management and enabling the satellite, telecom, television broadcasting, and cable operators to become truly global players can be fulfilled by enacting space laws and creating an independent and autonomous regulatory body. A well-defined regulatory body in India shall enable proper administration of all non-Federal Government use of the radio spectrum, all interstate telecommunications and all international

²⁴ Indian Aviation-Civil and Military (Bombay), 1st July 1994.

communications that originate or terminate in India. Accordingly, the Government of India needs to take immediate and necessary action to frame a consolidated and codified law to govern the existing system for improvement in the space business.

In addition, India should take active part in various International forums and help, in evolving the International Space Legal Regime from the perspective of developing nations. There is no denying of the fact that following a carefully planned strategy has enabled India to become one of the world's leading space faring nation and at present India is a powerful house of information and capacity, to play a vital role in sustainable development of not only Indian citizens but also of the underprivileged of other developing nations. Legislations can be both inhibitive and facilitative in any of the fields, and surely, can also, be custom made to suit the specific requirements of situations and countries.

Therefore, India should enact a National Space Legislation in which:

- Needs for international commitments are defined and taken care of, in bare minimum possible details (as the situation is still emerging)
- Needs for promotion of privatization should be dealt with in maximum details to encourage free market commercialization whose benefits could reach the masses.
- India's National security concerns and International Rights should also be detailed.

The proposed legislation should further provide for Creation of National Space Agency, Licensing, and Certification of space activities, Economic Conditions of Space Activities, A Provision on Space Infrastructure, Space Safety and Space Liability, Space Insurance, International Cooperation and Protection of Intellectual Property Rights in Outer Space. This draft legislation should be a convergence of divergent regulations in order to create a comprehensive and harmonious space legislation that would be beneficial for our nation. But surely in my opinion all this should be done in the earliest possible time frame.

A survey over the forty years since the space treaty was signed reveals that the space treaty has set up a structure of space law based on very useful norms that will continue to guide world order for the next forty years or more. The space treaty calls for space exploration to be conducted for the benefit of all States. It stipulates that space shall be a province for all mankind. States have freedoms of outer space for exploration, use and scientific investigation. Non-appropriation of space etc. is a recognized law of nations. States shall conduct activities in space to promote international cooperation. And outer space shall not be an area for military activities; no weapons of mass destruction shall be placed in the orbit of earth. During past four decades, space exploration has changed world society. Enormous changes have taken place resulting in advances in telecommunications, education, remote sensing of earths resources, air space management, and the management of forests, rivers, towns etc. Thus, it is very evident that space law and science need interaction. Space exploration has been a product of advance in many disciplines of the sciences. To understand space law for future decades particularly calls for close integration of space law and the sciences.

Space law in both its general and treaty-based forms have changed world society towards peace, economic prosperity and cooperation. The world community and the UN are to anticipate future problems of world order and environment

management. Space exploration and space law can help resolve global issues through international cooperation, which in turn can lead to sustainable development and social benefits.

