Institute and Center for Research of Air and Space Law
McGill University **(Canada)**

PROCEEDINGS OF

THE SPACE LAW CONFERENCE 2006
Asian Cooperation in Space Activities
A Common Approach to Legal Matters

(2-3 August 2006, Bangkok, Thailand)

Conference organized

by

Ministry of Information and Communication Technology
(Thailand)

and

International Institute of Space Law **(IISL)**

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Preface

Space Law is not a well known subject in the Asian countries. Although some of these countries assert to have some knowledge in this field, a majority of them do not recognize its full significance. Given this lack of awareness, they do not seem to realize that some of their rights under the international Space Law are being violated and the corresponding obligations are being ignored. The cause of this situation is perhaps embedded in many factors such as territorial sovereignty, historical, economic, social and political conflicts. Nevertheless, a group of dedicated Asian professionals and specialists in Space Law find that if the Asian countries could look beyond some petty political conflicts, the Asian cooperation in space activities could emerge through common approaches to several legal matters. Therefore, a small group of such professionals initiated and organized the International Space Law Conference 2006 in Bangkok, Thailand.

This Conference was divided into six sessions. The first part of the Conference covered a broad range of "Reforming the Regulatory Regimes governing Telecommunications in Asia", then moved towards a broader range of "National Space Legislation: Developments in Asia". After these two broad sessions, the third and fourth sessions concentrated on more specific subjects of "Asia's Role in Remote Sensing and Legal Aspects of Access to High-Resolution Satellite Imagery" and "Legal Aspects of Disaster Management: Initial Results and Suggestions for Improvement of the International Charter on Space and Major Disasters". Session five focused the discussion on several aspects of "Regional Cooperation in Asia Relating to Space Activities." This session provided more insights into what other issues could emerge from this cooperation and what are possible implications of such cooperation. The Conference ended with the catch-all topic of "Other Legal Issues Arising from Space Exploration and Exploitation" that discussed issues that might not have been covered by other sessions.

This Conference was held for several purposes. The first purpose was to initiate and expand awareness of the importance of Asian Cooperation in Space Activities and to make participants realize that space activities should not remain only the dominion of the Western countries. In this new day and age, Eastern countries should recognize the need to cooperate among them. They must look beyond past and present political conflicts. Natural disasters (like tsunamis) come in a more intense and extensive form and in order to survive such calamities cooperation among all Asian nations is the only means. The second purpose of the Conference was to build a good foundation for space activities. In order to do so, guidelines should be vividly set so all parties could play by the rules. The rules could be derivative of existing successful models, revised old models, as well as new and innovative models. However, the negotiation and conclusion of such guidelines-rules depend upon the nature and complexity of the constraints confronted in building the desired cooperation. The third purpose of the Conference was to encourage participation by all countries and brain-storming of ideas. We hope that all participants were able to share their knowledge and experiences in building Asian cooperation through the open forum that the Conference provided.

In brief, the International Space Law Conference 2006 was organized with the hope that creative ideas will be generated and that Asian cooperation will go beyond the limits of the Conference. I believe that this goal was realised to a great extent.

Nipant Chitasombat
Conference Organizer

WELCOMING ADDRESS

By

Tanja Masson-Zwaan*

Your Royal Highness, Princess Maha Chakri Siridhorn,

On behalf of the International Institute of Space Law and its President, Mr. Nandasiri Jasentuliyana, I am honoured to address a few words to you to thank you most sincerely for your presence here today and for your interest in this space law conference, which has been jointly organised by the Ministry of Information and Communication Technology of Thailand and the International Institute of Space Law in Paris, France.

This meeting is the fourth in a series of regional conferences organised by the IISL, initiated in 2001 in Singapore, and followed by similar conferences in Beijing in 2004 and Bangalore in 2005.
The International Institute of Space Law (IISL) was founded by the International Astronautical Federation (IAF) in 1960 and has elected members from more than 40 countries and from diverse professional backgrounds. The IISL has held nearly 50 annual Colloquia on space law issues in many countries, and also organizes an annual Space Law Moot Court Competition for law students, in which Thailand has participated several times. The IISL also designates observers to the annual sessions of the UN Committee on the Peaceful Uses of Outer Space in Vienna, and presents reports on its activities to the Legal Subcommittee.

Your Royal Highness, your support of this conference demonstrates the commitment of Thailand to help bring about closer cooperation in the regulation of space activities within Asia, so as to develop a common approach to the legal matters that are involved. We hope that the coming days will help to initiate an active exchange of information among the many Asian countries that are represented here in Bangkok, and that it will result in useful discussions and perhaps even agreement on the steps to be taken in the short- and medium term.

The Conference will address a number of topical subjects of special importance for Thailand and the Asian region. Indeed, the space age today has come to a point where global interdependence, international and regional cooperation, as well as ever-increasing participation of the private sector are the key words. The speakers who gathered here from around the world will address a plethora of topical questions that necessitate further efforts in regulation and harmonisation, in order to foster the benefit and interest of all countries, as required by the 1967 Outer Space Treaty. Please allow me to briefly mention the topics that the conference will address.

1. Firstly, we will have a session on Reforming the Regulatory Regimes governing Telecommunications in Asia. The Asian region is home to about one half of the world's population and is developing very rapidly, and yet half of the world's population has never made a phone call. We can expect a major expansion of telecommunications via satellite in the Asian region. Availability of radio frequencies and orbital positions, the inadequacy of

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the regulatory regime that governs them and the future role of the International Telecommunication Union (ITU) are key questions to be addressed in this context. Competition for frequencies and orbital slots in Asia will increase, and the states of the Asian region will need to cooperate more, both within the ITU and within regional frameworks, such as the Asia Pacific Satellite Communications Council (APSCC) and ASEAN.

2. The second session will deal with National Space Legislation: developments in Asia. After various discussions in our previous space law conferences, there seems to be general agreement on the need for space legislation in various Asian states. This means that significant advance could be made in this field also in Thailand, and that questions like licensing, intellectual property rights, insurance, or market entry by private actors could be given a proper national legal framework, in accordance with the international space law treaties.

3. Next, we will discuss Asia's Role in Remote Sensing and Legal Aspects of Access to High-Resolution Satellite Imagery. Here, the distinction between services that are so essential for the public that their access by all must be guaranteed, and services that are rendered with the sole purpose of making a profit, will be discussed. Increased commercialization characterises the satellite remote sensing market. This trend has reduced the investment risk and therefore increased the financial viability of remote sensing ventures by the private sector. The advent of high resolution imagery has brought forth a legal challenge as to how best to secure the right of privacy and at the same time ensure the principle of non-discriminatory access to data by the sensed states, at affordable prices, as called for in the UN Remote Sensing Principles. Discussions may indicate that a self-imposed "code of conduct" by the industry could be the preferred option, and Asia could significantly contribute to its realisation.

4. The important topic of session 4 is Legal Aspects of Disaster Management: initial results and suggestions for improvement of the International Charter on Space and Major Disasters. This topic is obviously marked by the terrible hardship that struck Thailand and many other countries in Asia during the Tsunami of 26 December 2004 – as well as the one very recently on Java. We can safely say that all Asian states agree that there is a genuine need for closer cooperation in this area, for instance by establishing efficient and accessible early-warning systems. But there are also many questions, such as whether a "good Samaritan" principle can be construed or whether a "duty to warn" exists and what the consequences of its non-observance would be. The role of the UN Remote Sensing Principles, the International Charter on Space and Major Disasters and of international humanitarian law will be addressed in this context.

5. Session 5 will address Regional Cooperation in Asia relating to Space Activities. Currently there is only limited cooperation in the field of space activities throughout Asia. There are little or no common fora for cooperation, and there is no dispute settlement system. The session will provide an overview of the current status of cooperation, for instance in the fields of launching, telecommunication, direct broadcasting via satellite, or remote sensing. Discussions will focus on possible mechanisms for increased cooperation, including for instance the promotion of mutual interests, standard building, cooperative participation in each other's activities, increased communication between participants, how to look after the special needs of the developing countries, or the matter of dispute settlement.

6. In the last session we will discuss Legal issues arising from space exploration & exploitation. In this field especially, we have to cope with the ever advancing trend of involvement of the private commercial sector, which is vital for the survival of space activity, be it in Asia or in the rest of the world. Ways must be found to adequately fill the gaps that do exist in the legal framework governing space exploration and exploitation, without jeopardising its valuable but fragile balance. Possibly, analogies with other areas such as the High Seas or Antarctica may prove useful. Here, interaction between scientists, engineers, lawyers, and political decision-makers is of the essence.

The IISL hopes that this space law conference could contribute to the further strengthening of recent encouraging trends toward democratisation in various Asian countries, including Thailand. We strongly believe that these countries have a major role to play in the next chapters of the exciting space age, which started fifty years ago.

Resolving these many legal questions will require creative and flexible solutions as soon as possible. The establishment of precise, efficient and enforceable regulations and guidelines, which must be, at the same time, flexible enough to handle the rapid progress in space technology, is the challenge which we must take up, all together. Let us try to make a modest contribution to this process in the next two days, and determine the role which the Asian region can and must play in this process.

Thank you for your kind attention, Your Highness.

Message from HRH Princess Maha Chakri Sirindhorn

On behalf of Thailand, I would like to warmly welcome all participants to Bangkok and to the first "Space Law Conference 2006" being organized under the title of "Asian Cooperation in Space Activities: A common Approach to Legal Matters."

Space is a new frontier for many countries, which can anticipate the availability of abundant resources. The pioneers who are able to explore outer space first will benefit the most from its exploration and exploitation. This is where legal matters come in picture. Space could be compared to the "Sea Frontier" where the signed conventions find common understanding on territories, boundaries, rules, etc. To actively engage in space and space activities, there must be a common ground for all stakeholders. This common ground will help reduce disputes amongst nations.

As the title of the Conference states, the purpose of this meeting is to find a legal common ground for Asian nations, both developing and developed countries. This is achieved through both enhancing legal awareness of the issues related to space and space activities, and increasing cooperation amongst legal professionals, including scholars and practitioners.

I hope this Conference will be a success and would like to thank all of you for your participation.

KEYNOTE SPEECH

By

Dr. Sompong Sucharitkul*

May it please Your Royal Highness Princess Sirinthorn Maha Chakri of Thailand, President of this Opening Session,
Excellencies,
Distinguished Participants in the Space Law Conference 2006,
Ladies and Gentlemen,

I. PROLOGUE

As an indigenous native of this home land of mine, the host country, it is a distinct honor for me to have been invited to give a keynote address to such an illustrious galaxy of celestial celebrities on a topic and a theme that are both near and dear to me: "Asian Cooperation in Space Activities: A Common Approach to Legal Matters."

More than half a century ago, I had a dream in the form of a vivid vision of positive cooperation in actual practice among Asian nations, a dream that I am delighted to see unfolding before my very eyes its actual gradual realization. Asia was not only vast and infinitely diversified, but also divided, and with very few exceptions, was ruled by non-Asians. It was hard for me from Bangkok to talk to a friend in Kuala Lumpur without making a trunk call to London. It was just as difficult to speak to an associate in Hanoi without having to dial through Paris, or to attempt a direct phone call to Bali bypassing Amsterdam. Thanks to the advent of the internet and the innumerable satellite links with countless networks of telecommunication systems currently in place, we in Asia can communicate with anyone any where. The cyberspace is free, so to speak. But not unlike other freedoms, such as freedom of navigation, freedom of the sea, and freedom of speech, it comes with a high cost. Free it is indeed, but not free of charge. That is partly one of the reasons why we are attending this auspicious gathering today, to explore the ways and means to minimize the cost and enhance freedom of communication through constructive competitiveness and effective cooperation.

Practically a decade and a half ago, I had occasion to present a paper, entitled "The Benefits of Space Activities for Asian Countries" at a meeting on "The Highways of Air Space and Outer Space Over Asia", held in Taipei, cosponsored by The International Institute of Air and Space Law of Leiden University. My paper then covered an essential portion of the central corps of our discussion today and tomorrow. Considerable amount of water has passed under the bridge since 1991. For one thing, I was silent on Thailand's passive role except as the host country of UNESCAP and as beneficiary of space activities of other Asian countries. Today, Thailand is almost a front runner with at least five satellites in orbit known as Thaicoms or Shincoms, not to mention countless other systems and networks of satellite and cable as well as wireless telecommunication and direct TV broadcast, broad band and via various means of communication linkages.

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In this keynote address, two principal themes will be highlighted. First and foremost, the principle of cooperation will be revisited with special reference to the practice of Asian nations. Subsequently, I propose to touch lightly on the relevant legal issues facing Asian and other nations in their collective endeavors to make the best out of the peaceful use of outer space, in particular, the urgent need for a common approach and a unified stand to tackle and resolve what appear to have been unending international legal problems.

II. INTERNATIONAL OBLIGATION TO COOPERATE

For most of us in Asia, it is practically a second nature to cooperate with one another as good neighbors. Cooperation is natural and instinctive in an ideal environment of friendly relations and constructive engagement. In this connection, a set of seven principles of customary International Law embodied in General Assembly Resolution 2625 was adopted by consensus at the United Nations in 1970, after a full decade of intensive study by a Special Committee on Principles of International Law Concerning Friendly Relations and Cooperation among States in accordance with the Charter of the United Nations, based upon mature consideration by governments and through a succession of rich debates in the Sixth (Legal) Committee of the General Assembly.

For present purposes, we may refer to this set of seven principles of Friendly Relations and Cooperation as the SATTA SILA after the model of the DASA SILA or the ten principles of Bandung Asian-African Summit of April 1955, and the Sino-Indian Treaty of Peaceful Coexistence, PANCHA SILA of 1954. The Chinese PANCHA SILA is homonymous but not conterminous with the Buddhist Principles of PANCHA SILA. The Sino-Indian Peaceful Coexistence consists of 1. Mutual respect for territorial integrity and sovereignty; 2. Non-aggression; 3. Non-interference: 4. Equality and mutual benefits; and 5. Peaceful coexistence. On the other hand, the five principles of Buddhist PANCHA SILA relate to five abstentions in human conduct, namely, 1. No taking of life, 2. No taking of property, 3. No wrongful sex practice, 4. No untruth or abusive language, and 5. No intoxicants. It should be remembered that Sukarno's PANCHA SILA of 1945 was a motto for Indonesian State, namely, nationalism, internationalism, democracy, social justice and a belief in a unified supreme being. There was in addition Chairman Krushev's doctrine of Peaceful Coexistence, different from its counterpart reflected in Bung Karno's national aspirations.

Among the ten principles of Bandung 1955 should be mentioned the Joint Communiqué, which declared, inter alia, that "Nations should practice tolerance and live together as good neighbors and develop friendly cooperation". The Drafting Committee in Bandung was chaired by Prime Minister Chou En Lai of China and the Rapporteur was Prince Wan Waithayakorn of Thailand, who was subsequently elected President of the United Nations General Assembly in 1956, and President of UNCLOS I in 1958 and UNCLOS II in 1960 respectively. Thus the practice of tolerance and good neighborliness are the corner stones of Bandung as much as the need and desirability to develop friendly cooperation among nations of Asia and Africa.

General Assembly Resolution 2625 of 1970 clearly endorses several of the ten Bandung principles. The seven principles of friendly relations and cooperation of the United Nations clearly highlight the international obligation to cooperate with one another in accordance with the Charter of the United Nations. They include the following principles:

(1) Non-Use of force, as enshrined in Article 2 (4) of the Charter;
(2) Pacific Settlement of Disputes as an obligation under Article 2 (3):
(3) Non-intervention or the duty not to intervene in matters within the domestic jurisdiction of another State or any State;
(4) Cooperation as a legal duty under the Charter;
(5) Self-determination or the principle of equal rights and self determination of peoples;
(6) Equality of States as opposed to hegemony; and
(7) Good faith, or the principle that States shall fulfill in good faith the obligation assumed by them in accordance with the Charter, including in particular, the obligation to cooperate with one another.

These seven principles have been followed in practice by States and continue to receive further endorsements in subsequent instruments, such as the Helsinki Accord of 1975, containing the Declaration on Principles Guiding Relations between Participating States. They are therefore clear principles for States to observe in their mutual relations. They lend countenance to our proposition of Asian Cooperation in Space Activities.

III. SHARED PERSPECTIVE OF COMMON LEGAL PROBLEMS

Among the many outstanding legal issues placed before participants in this Space Law Conference 2006, as identified by the Conference, are the items to be discussed by the six panel sessions in the course of the Conference sessions today and tomorrow. Leading to the substantive debate on the items on our agenda, a number of preliminary points need to be made for clearer perception and wider appreciation of the broader issues surrounding the legal matters under active consideration.

(1) Coexistence of Multi-dimensional Space Law in Multiple Legal Orders

It is to be recalled by way of general observation that the earliest of international organizations that have survived the vicissitudes of international political order have been administrative in nature and necessitated by the practical need of the peoples around the globe, such for instance as the Universal Postal Union, the International Telephone and Telegraph Union and the International Telecommunication Union. These International Organizations have preceded other social, economic or cultural agencies, such as ILO, UNESCO, FAO and WHO. They have been driven by the necessity to cooperate across national frontiers. For telecommunication and satellite communication with peoples in all parts of the globe it is difficult not to recognize the practical necessity of removing the artificially man-made barriers such as national boundaries.

At the outset, international regulatory regimes, albeit primitive in character, have to be invented and put in place with the consent of States that have come but naturally because of popular demand. The International regimes are subjects of international legal creation, belonging to the international or global legal order. Subsisting with the international regimes are also the national governmental agencies, competent and responsible for the smooth operation of the international or transnational carriage and delivery of the mail and packages or telephone and wireless communications and messages across, beyond and within national frontiers. Hence we see the advent of governmental control and regulatory regimes within each national territory, not to mention the internal administrative arrangements within each of the private sectors that also

have an active part to play in the investment and the establishment of international and transnational networks of telecommunication pursuant to the aims and purposes of the United Nations. For example, the World Trade Point Federation (WTPF) is designed to provide communication and information services in the field of trade in accordance with the directives of UNCTAD. To this end, an enterprising group in Thailand is proposing a Free Television World Trade Point Channel, covering a variety of news services for dissemination in the field of educational, cultural and trade development across and beyond national boundaries.

On the one hand, the operation of these ubiquitous telecommunication systems is run by nationals and companies of States side by side with Government agencies and are subject to the same multiple regulatory regimes, one dimension on top of another, e.g., regional on top of national dimensions, and global or universal on top of regional dimensions. On the other hand, the process of deregulation or privatization of the business in the commercialization of the operation of an international satellite communication network deserves utmost care and consideration, such for instance as the management and operation of Intelsat or Comsat, initially governmental and subsequently shared by private sectors on a businesslike basis. For instance, there is a pending proposal for the Global Thai TV Network, using Intelsat 907 @ 332.5"E with coverage over Asia, Africa, America, North and South and the Caribbean, as well as Australia and Europe, with Scopus Network Technology, a new approach to DVB Terrestrial Systems, together with Corinex Telephony sharing broadband internet access, and Speedcast (Hong Kong) with the cooperation of Japan Broadcast and Japan Beam.

One of the continuing problems is the need or the inability to identify the particular legal regime or legal order under examination and the realization that in the ultimate analysis there must be one final agency with the last word on such questions as the distribution and allocation of radio frequencies or the replacement of a satellite in geostationary orbit. These are some of the problems to be regulated in an amiable and practical manner. The first panel session will have a handful of legal issues to examine. Primarily, the panelists will have to be able to identify and specify which regulatory regimes they are planning to reform. Rather it might be more accurate to endeavor to streamline, coordinate and assimilate, or in any event harmonize the varying regulatory norms that cannot altogether be amalgamated or integrated in the ultimate global legal order. A priority if not hierarchy of norms has to be formed and worked out empirically through the consistent practice of States, acting in good faith, and for the common benefits of mankind as a whole, and for Asian nations and peoples in particular, especially to ease the plight of Asians living below poverty line and to improve their predicaments.

(2) Use of Terms

The second question that requires urgent consideration is consensus or virtual agreement on the use of a set of crucial terms or the adoption of an agreed vocabulary. Many legal notions remain imprecise and several questions unsettled. By way of example, the term "space" or "airspace" or even "space law" under current discussion may include "outer space", as the two are interchangeably used. In any event, "outer space" overlaps a good portion of "airspace". There appear still to be some overlapped areas or zones between "upper airspace" and "lower outer space" or "space" which do not appear to be capable of more precise definition. When an activity is designated as "space activity", it may occur principally, although not exclusively, in the outer space. In fact, most space objects have been launched from the surface station on earth, and having inevitably passed in flight through the territorial airspace of several national

jurisdictions before attaining the necessary altitude to enter and remain in orbit. Their flight path in orbit could remain entirely in outer space or partially within territorial airspace or even intermittently traveling through a neutral zone, known as *neutralia,* between the upper limits of the territorial airspace and the undemarcated terrestrial frontiers of outer space. To talk of a demarcation line between space and airspace with or without an intermediate zone called "*neutralia*" is to speak in riddle, as there are no agreed lines or even precise definitions as between "space" and "airspace". Some measure of relativity is allowed to persist.

Many schools of thought have been contending on the precise definition or delimitation of the limits between "space" or "outer space" and "airspace" or "territorial airspace", traceable back to the Roman law principle of private ownership: *Cuius est terra huius est usque ad coelum et ad inferos.* In the absence of an agreed definition or delimitation of "coelum" or "heaven" or "skies", "usque ad coelum" can be read to mean almost "usque ad infinitum" which would be tantamount to extending the limits of territorial sovereignty "usque ad absurdum". Others contend that territorial airspace only extends up to the ceiling of "conventional aircraft flight". Today many types of hybrid aircraft such as the X-15 could attain the altitude of 47 miles. Another contender is the limitation of territorial sovereignty up to the lowest orbital path of an artificial satellite. This is otherwise also known as the "périgée" approach which would set a limit to between 50 to 60 miles, slightly lower than that suggested by McMahon. There is additionally the "Karman" jurisdiction line extending up to approximately 53 miles national territorial sovereignty, up to the boundary between the lift and the drag. In other words, the ceiling of national sovereignty could be the horizontal line where an object traveling at 25, 000 feet per second loses the aerodynamic and centrifugal force takes over.

Whatever your preference may be, please remember that the vertical measurement of height or altitude is more universally understood in metric terms of kilometer not mileage. The subject areas of our discussion are thus full of contradictions and theoretical confusions. It is hoped that these preliminary remarks on a few salient points will help in some measure to clarify or at least to identify some of the hidden enigma that will emerge in the course of our discussion.

Clearly, the second panel session is devoted to developments in Asia of national space legislation. An inherent problem has been detected in the term "space" when applied to legislation, and the expression "national" distinguishes it from the controlling rules of international law governing the use of outer space and space activities in general. The discussion will nonetheless throw more light on the existing and even future practice of States, as a comparative analysis of progressive development in national legislation is an essential part of any investigation on the formation of rules of customary international space law before they are ripe for codification through the process of codification convention.

(3) Sources of International Law Governing Space Activities

As the second panel session begins to examine developments in national space legislation in Asia, it is hoped that the panel takes full cognizance of existing rules of international law governing the pertinent sections of space activities covered by national legislation. This critical review by the panel will have practical implications since the main and unmistakable object of national legislation must be to give effect to the rules and principles of international law on the topic.

Suffice it for present purposes to make a brief reference to the law and international legal framework governing space activities. It is fashionable to state the proposition that the peaceful use of outer space is free and open to all. Yet this freedom is not unrestricted by law as it is indeed confined within the limits agreed upon by States as expressed in a series of Treaties, Conventions and International Agreements. Without elaborating in any detail the contents of these conventional rules of international law, it is by now common knowledge that the established *corpus juris* of international space law consists at the minimum the following instruments:

1) The Outer Space Treaty or the Treaty on Principles Governing Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, 1967. It is convenient at this point to confirm that freedom to develop space is restricted to space activities that benefit all mankind, as a whole with an emphasis on the needs of the least developed countries.

2) Agreement on Rescue and Return of Astronauts and Return of Space Objects, 1968. This agreement provides notification guidelines to launching States. Third States learning of a space related emergency are under an affirmative obligation to notify the launching State or States.

3) Convention on International Liability for Damage Caused by Space Object, 1972 or the Liability Convention, setting for the first time an international standard of absolute liability or liability without fault for injury suffered on the surface, while maintaining fault-based responsibility for damage caused by collision in mid space or to other space objects, as opposed to accidents on or above the surface involving conventional or hybrid aircraft in the lower territorial airspace.

4) Convention on Registration of Objects Launched into Outer Space, 1975, imposing an obligation on the part of every launching State to register each launch under this 1975 Registration Convention, thereby turning into legal obligation the recommendation contained in General Assembly Resolution 1721 (XVI) 1961 for launching States voluntarily to maintain a public registry of objects launched into outer space.

5) The Moon Treaty or the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, 1979, clarifying and adding further precision to the 1967 Outer Space Treaty.

In addition to this *corpus juris* of space law, there is a host of soft laws or policy directives or guidelines laid down by an international body set up for this purpose, namely the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS). This Committee has been actively examining questions relating to the control of remote sensing of the earth by satellites, particularly for prospecting of natural resources on or subjacent to the surface of the earth within and beyond national jurisdictions, international control of direct television broadcasting by satellites and last but still relevant the boundary between airspace and outer space, as well as the permissible use of nuclear power in outer space.

Certain policy issues have been adopted in the form of General Assembly Resolutions, or soft laws so to speak, such as Resolutions 1721 (XVI), 1884 (XVIII) and 1962 (XVIII), many

of which have been integrated in subsequent treaties and conventions. Even before these policy statements finally concretize and ripen into binding norms, they already serve as policy guidance or directives to which States should strife to make their national legislation conform as a matter of *ordre public international.*

In this particular connection, the third panel session on Asia's Role in Remote Sensing and Legal Aspects of Access to High-Resolution Satellite Imagery will be guided by existing norms as formulated and crystallized by the UNCOPUOS. The guiding criteria should include the common benefits of mankind as a whole and the Asian principle of good neighborliness and cooperation in the equitable participation of Asia in the shared resources of the good earth.

4) Cooperation in the Equitable Distribution of Shared Resources

Without overlapping each other, Panel III and Panel IV Sessions share the same notion of the equitable allocation of shared resources. Asia is the largest continent with the most population on earth, yet Asia remains the land of contrast with the richest country in the world and peoples of considerable wealth but it is better known for its utter poverty among the largest proportion of the populace of Asia. Thus, it is in the sharing of benefits from remote sensing satellites under Panel III or Disaster Management under Panel IV that the current arrangement and existing mechanisms leave much to be desired. Following on Panel III Session today, Panel IV Session could pick up some concrete suggestions as Asia was devoid of sufficient warning system and totally unprepared for the Tsunami Disaster of December 2004. Clearly UNESCAP has initiated several projects that could assist in future disaster management with sufficient warning through a network of satellites monitoring the changes in the ecosystem and climate changes. Panel IV Session deserves our utmost attention. It is my submission that Asia is eminently qualified to be given top priority in the consideration of improved conditions for the efficient and timely functioning of the International Charter on Space and Major Disasters. Of course, Asia does not neglect its own primary duties in disaster management, but Asia should be given a fair chance to be better prepared for future tsunamis or the like which are certain to occur only as a matter of time, and not whether or not they would ever recur. This is also a matter of general concern for WMO and IMO.

5) Regional Cooperation in Asia Relating to Space Activities

This is the central core of the main themes of the Conference. We have started with the dire necessity for Asian cooperation in the area of space activities. Asian nations have not been unmindful of their fundamental obligations. Asians must now **hang together,** to borrow an expression coined by Dr. Rajaratnam some thirty-nine years ago almost to the day on the occasion of the launching of ASEAN into orbit in August 1967, not very far from where we are seated this morning, or else warned the Singaporean Senior Statesman, they will **hang separately.** His warnings have been most resonant and have not faded in the slightest from our living memory.

6) Legal Issues Arising from Space Exploration and Exploitation

The sixth panel session will examine the overall legal issues arising out of peaceful uses of outer space, primarily in the exploration and eventual exploitation of outer space. The final panel session will be leading to the conclusion of the conference to be undertaken by the capable hands of the concluding panel.

IV. CLOSING NOTE

It is time for me as keynote speaker to take leave of distinguished participants, having presented an overview of what is in store for you. It remains for me, with distinct honor and pleasure, to convey to each and every one of you the very best of good wishes for the success of the Conference, not only for the next two days ahead, but more enduringly for the months and years ahead for the common benefits of mankind as a whole, and of Asian nations in particular.

PAX VOBISCUM.
Sotthi te hontu sappada.
May peace and prosperity be with all of you.
LONG LIVE THE KING

Session 1

Reforming the Regulatory Regimes Governing Telecommunications in Asia

REFORMING THE REGULATORY REGIMES GOVERNING SATELLITE TELECOMMUNICATIONS IN ASIA

by

Ram Jakhu[**]

A. INTRODUCTION

The Asian region hosts about 1/2 of the world's population. Led by China and India, the most of the countries in the Asian region are developing economically rapidly. However, the level of tele-density in the region is still quite low. It is generally accepted that telecommunications infrastructure and services are indispensable tools for socio-economic and cultural development of a country. In other words, (a) telecommunication "facilities and services are not only the consequence of economic growth, but a prerequisite for overall development; and (b) telecommunications are an integral part of the national and international development process".[1]

This means that there is a need for a major expansion of telecommunications in the region; consequently there might be an enormous market for telecommunications equipment and services. It is undisputed that satellites are the best means for a rapid expansion of telecommunications, particularly for mobile and thin-route services. Because of the unique advantages of satellites, their use in the Asian region will expand rapidly. However, the level of that expansion will greatly be determined by the availability of the two indispensable tools for satellites, which are radio frequencies and orbital positions.

The title of this Paper indicates a very broad subject; however I will concentrate only on one issue that relate to the use of radio frequencies and orbital positions for satellite communications. Firstly, I will describe the current situation which is becoming more problematic as the demand for radio frequencies and orbital positions increases. Secondly, I will analyze the current international regulatory regime governing the access to and use of these tools with a view to highlight the weaknesses therein. Thirdly, I will present a few but key recommendations that should be followed in the context of regional cooperation so that the required telecommunication services become readily available in the Asian region.

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[1] Constitution and Convention of the International Telecommunication Union, Decisions, Resolutions and Recommendations adopted by the Plenipotentiary Conference (as amended in 2002), Resolution No. 31on "Telecommunication infrastructure and information and communication technologies, for socio-economic and cultural development."

B. PROBLEMATIC SITUATION

1. Orbital slots and radio frequency bands indispensable but scarce resource

The two indispensable tools for satellite telecommunications are the radio frequencies with which a satellite is operated and the orbit in which a satellite is placed in outer space. But both of them are international in their legal status and are scarce (limited) in their availability.

Only a limited portion of the radio frequency spectrum is useful for the satellite telecommunications. The radio frequencies for satellite telecommunications are also shared by terrestrial and other satellite services. Hence, there is a strong competition for the use of radio frequencies. The almost 24-hour "visibility" of a satellite in the geostationary orbit [hereinafter the GSO] makes it the most advantageous, used and desired orbit. The satellites in LEO and MEO, being closer to the Earth, can provide effective service to small hand-held terminals – a mobile communications service via satellite. However, that advantage of LEO and MEO has started withering away because of the development of technology that allows similar services to be provided from the GSO. Therefore, LEO's and MEO's might not become popular orbits with the commercial satellite telecommunication community and the GSO would remain the most favored orbit for all sorts of telecommunications, at least in the near future.

Both radio frequencies and orbital positions are a scarce resource, in law and in fact. Since l973, the ITU's constituent legal instruments have been declaring radio frequencies and orbital positions as a "limited natural resource."[2] The adjective "limited" signifies that a band of frequencies and various orbits can accommodate only a finite number of satellites without mutual harmful interference. Irrespective of extensive technological improvements, it still remains undeniable and undisputed that the radio frequencies and the satellite orbits have been, are and will be a "limited natural resource." Therefore, there arises serious competition and consequently some disagreements for the acquisition of appropriate radio frequencies and orbital positions as the demand for them grows.

2. Growing demand for radio frequency bands and orbital slots

The demand for satellite communications and consequently the competition for appropriate radio frequencies and orbital positions are and will be growing exponentially. The satellite over-capacity on the orbit, which was mainly caused by the burst of dotcom companies, is becoming a matter of the past.

Satellite industry's total world revenue reached $103 billion in 2004 and could exceed $158 billion in 2010.[3] The biggest segment of the space industry is telecommunication services, which are constantly expanding and transforming.[4] The increasing use of fiber-optic and

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[2] Article 44 on "Ensuring equitable access to the radio frequencies and the geostationary satellite orbit" of the presently applicable 1998 Constitution of ITU, as amended by the 2002 Plenipotentiary Conference.

[3] See the International Space Business Council Report on the *2005 State of the Space Industry*, "Space & Satellite Market Surpasses $103B, To Reach $158B By 2010," Bethesda MD (SPX) (Aug 10, 2005), online http://www.spacedaily.com/news/industry-05zg.html (date accessed: 10 August 2005).

[4] "The Latest Trends in the Satellite Communications Industry," Dublin, Ireland (SPX) (May 09, 2006), online <http://www.spacemart.com/reports/The_Latest_Trends_In_The_Satellite_Communications_Industry.html> (date accessed: 17 May 2006). Also see, Futron Industry Report, "The Transformation of the

terrestrial wireless technologies is not deterring the demand for satellite capacity, particularly for services like high definition TV, mobile communications,[5] data and broadband Internet and CD quality satellite radio.[6] According to Futron's latest 10-year forecast, "the demand for commercial satellite services continues to be strong and growing. For example, overall demand for satellite capacity is expected to increase by more than 5 percent a year."[7]

As in other parts of the world, satellite industry in Asia has been having transponder overcapacity "at a high 60% to 70%", but the year 2006 is considered to be the start of a real recovery.[8] Asia-Pacific region, which is "a horde of developed and soon to be developed economies, will win the race by sheer force" of the number of the people in the region.[9] Direct-to-home (DTH) Broadcasting will be Asia's dominant potential as a satellite services market. According Peter Galace, "China may become the world's largest DTH market in less than a decade with some 260 million households as potential market for DTH. (And India, on the other hand) is poised to become Asia's leading cable market by 2010, the largest satellite market by 2008 and the most lucrative pay TV market by 2015."[10]

Satellites are being launched not only for national service but also for services in foreign countries. The World Trade Organization (WTO) Agreement on Basic Telecommunications annexed to the General Agreement on Trade in Services, which was concluded on 15 February 1997, is a market-opening accord based on world-wide commitments to opening markets, promoting competition, and preventing anti-competitive conduct. The Agreement covers all sectors of basic telecommunication services including *inter alia* voice telephony, data transmission, telex and telegraph, leased circuit services, irrespective of the transmission technology used (i.e. wire-based, radio-based or satellite-based). The Agreement ensures that national telecommunication markets must be made available to all WTO Members on a non-discriminatory basis. In the Asian region, several foreign satellites provide national domestic services. For example, ACeS satellites serve China,[11] India,[12] Sri Lanka,[13] etc. Similarly, the American Intelsat

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Satellite Services Industry," Bethesda MD (SPX) (Jan 24, 2005) online: <http://www.spacedaily.com/news/satellite-biz-05i.html> (date accessed: 8 July 2005).

[5] Market growth for wireless TV enabled telephone is expected to reach $30 billion in the near future: see Gene Koprowski, "Wireless World 30 Billion in TV Phones", Chicago IL (UPI) (Feb 19, 2006) online: <http://www.spacedaily.com/reports/Wireless_World_30_Billion_In_TV_Phones.html> (date accessed: 22 February 2006). Also see, Gene Koprowski, "Wireless World: Satellite Phones on the Rise," Chicago IL (UPI) (Aug 20, 2004), online <http://www.spacedaily.com/news/satellite-biz-04zzzzt.html> (date accessed: 26 August 2004).

[6] The world-wide market for satellite digital radio that could increase to 22 millions units by 2009: "Worldwide Market for Digital Radio To Increase To 22M Units By 2009: R&M," Dublin, Ireland (SPX) (Jan 16, 2006), online: <http://www.spacedaily.com/news/Market_For_Digital_Radio_To_Increase_To_22M_Units_ By_2009.html> (date accessed: 21 January 2006).

[7] "Satellite Services Demand The Future in High Def", Bethesda MD (SPX) Jun 16, 2006, available at http://www.spacemart.com/reports/Satellite_Services_Demand_The_Future_in_High_Def.html (date accessed: 20-Jun-06).

[8] Peter I. Galace, "Asia's Satellite Industry: Winning by the Numbers," SatMagazine.com, June 2006, available at http://www.nsr.com/Content/satmag-cover-story.pdf (last visited: 05-Jul-06).

[9] Peter I. Galace, "Asia's Satellite Industry: Winning by the Numbers," SatMagazine.com, June 2006, available at http://www.nsr.com/Content/satmag-cover-story.pdf (last visited: 05-Jul-06).

[10] Peter I. Galace, "Asia's Satellite Industry: Winning by the Numbers," SatMagazine.com, June 2006, available at http://www.nsr.com/Content/satmag-cover-story.pdf (last visited: 05-Jul-06): "New commercial satellite services such as DMB (Digital Multimedia Broadcasting) via satellite and broadband via satellite hold the brightest promise for Asia's satellite companies, ……revenues of $2.7 billion in 2004 should grow to $4 billion in 2009."

[11] "ACeS Extends Its Reach To China", Singapore (SPX) Nov 08, 2004, available at http://www.spacedaily.com/news/satellite-biz-04zzzzzzzzm.html (date accessed: 08-Nov-04).

satellites (i.e. IS-601,602,604,605,701, 704,706,709,802, 804,902,904 & 906) and PanAmSat systems (i.e. PAS-2, 4, 7, 8 & 10) serve the Asia-Pacific region. The number of such satellites will increase, as each country in the region might not be in a position to launch its own satellites or might not be able to meet all its telecommunications needs with its national systems.

The existing space-faring nations are increasing the number of their satellites. At the same time, more nations want to launch and own their own satellites. The countries that have planned the acquisition of their first satellites include Iran, Norway, Kazakhstan, Sudan, and New Zealand.[14]

The demand for radio frequencies by the military purposes is increasing. The national and international conflicts or crisis, including 'war on terror' necessitate instant, reliable, extensive and versatile communications. Satellites seem to serve such demand readily and efficiently. For example, according to Peter Galance, "The wars in Iraq and Afghanistan are eating up massive satellite bandwidth to support coalition military operations. …..It believes that military use will generate 46% of all satellite service revenues from 2002 to 2007."[15] This implies that radio frequencies required for civilian and commercial use become limited.

There is, and will be in the future, undoubtedly an increased demand for more satellite capacity, which would necessitate more appropriate radio frequencies and orbital positions. This fierce competition will not be resolved with technical means only. Technical solution of reducing satellite spacing is not always the most viable means for accommodating more satellites in the orbit. For example, in order to accommodate an increasing number of satellites spacing between them is being reduced from 9 degrees to 5 and even to 2, depending upon the radio frequencies used, the nature of service provided and the geographical areas being served. However, signal interference increases as high-powered signals are generated and transmitted to Earth, particularly for television, cellular and broadband applications.

As discussed below, increased demand for appropriate radio frequencies and orbital positions would result in increased interference, disputes and even jamming, increased costs to operators, regulatory authorities and the ITU. The need for international cooperation is imperative in order to devise and implement appropriate rules and implementation processes.

Let us now have a look at the current ITU regulatory regime from the perspective of its adequacy or inadequacy to meet the increasingly extensive and complex requirements for radio frequencies and orbital positions of the Asian region.

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[12] "ACeS Receives Indian Licence", http://www.spacenewsfeed.co.uk/2001/4February2001.html#Satcoms (last visited: 05-Jul-06).

[13] "ACeS Satellite Service Launch In Sri Lanka", http://www.comlinks.com/satcom/aces.htm (last visited: 05-Jul-06).

[14] Space Security 2006, page 40, available at http://www.spacesecurity.org/SSI2006.pdf (date accessed: 05-Jul-06).

[15] Peter I. Galace, "Asia's Satellite Industry: Winning by the Numbers," SatMagazine.com, June 2006, available at http://www.nsr.com/Content/satmag-cover-story.pdf (last visited: 05-Jul-06).

C. SEARCH FOR SOLUTIONS

1. Current ITU Regulatory Regime

The international treaties that specifically regulate the use of radio frequencies and the satellite orbits have been developed mainly through the International Telecommunication Union (ITU) – the oldest specialized agency of the United Nations. These treaties are the ITU Constitution and Convention and the Radio Regulations that attempt to assure that the radio frequencies and orbital positions are distributed fairly amongst all States.

The ITU Member States are obliged to limit their demands for radio frequencies and orbital slots to the minimum necessary to provide services and to use them rationally, efficiently and economically so that all countries may have equitable access to them.[16] While emphasizing efficient and economic use of radio frequencies and the satellite orbits, Article 44 (2) of the ITU Constitution contains no provision to ensure equity, except through the adoption of new Radio Regulations, which is a long and tedious process. The provisions of Article 44(2) have not resulted in any satisfactory "equitable access" by all countries, except in the case of two *a priori* allotment plans for two services using two frequency bands; i.e. (a) the BSS operating in 12 GHz band and associated feeder links; and (b) the FSS operating in 6/4 GHz and 14/11 GHz bands.[17] These plans distribute radio frequencies and orbital positions to all States on an equitable basis taking into account their requirements.[18] The rarity of such plans is attributable to the unwillingness of ITU members to accept restrictions on their sovereign freedom of action in the use of spectrum/orbit resource.

In practice, all States (Administrations) remain free to choose and assign particular radio frequencies and orbital positions to their respective satellites, as they deem appropriate for protecting and enhancing their national interests. In the exercise of such freedom, States are obliged to avoid causing harmful interference to the radio frequencies and orbital positions that have been registered earlier with the ITU.[19] This rule is also called the practice of "first-come, first-served". In other words, the State which notifies its intention of starting a satellite telecommunication service from a particular orbital position and using certain radio frequencies

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[16] Article 44 of the ITU Constitution specifies that:

(1) Member States shall endeavour to limit the number of frequencies and the spectrum used to the minimum essential to provide in a satisfactory manner the necessary services. To that end, they shall endeavour to apply the latest technical advances as soon as possible.

(2) In using frequency bands for radio services, Member States shall bear in mind that radio frequencies and any associated orbits, including the geostationary-satellite orbit, are limited natural resources and that they must be used rationally, efficiently and economically, in conformity with the provisions of the Radio Regulations, so that countries or groups of countries may have equitable access to those orbits and frequencies, taking into account the special needs of the developing countries and the geographical situation of particular countries.

[17] Appendix 30, 30A and 30B of ITU Radio Regulations.

[18] It is interesting to note that, the 1979 ITU World Administrative Radio Conference under its Resolution 507, considered the *a priori* planning approach imperative for broadcasting satellite service in order "to make the best possible use of the geostationary-satellite orbit and of the frequency bands allocated to the broadcasting-satellite service" since a "great number of receiving installations using such directional antennae as could be set up for a broadcasting-satellite service may be an obstacle to changing the location of space stations in that service on the geostationary-satellite orbit, as of the date of their being brought into use."

[19] Art. 45 ITU Constitution, "All stations, whatever their purpose, must be established and operated in such a manner as not to cause harmful interference to the radio services or communications of other Members or of recognized operating agencies, or of other duly authorized operating agencies which carry on a radio service, and which operate in accordance with the provisions of the Radio Regulations."

is protected against harmful interference from the late comers. Such intention is considered to be expressed when registering with ITU the required radio frequencies and orbital positions. The process of registration of the radio frequencies and orbital positions is essential because the international rights of States with respect to their frequency assignments are derived only from the recording of those assignments in the ITU's Master International Frequency Register.[20]

For the purpose of registration, the notifying State is required to send to the ITU the required information which is published by the organization. This process is called "advance publication". The State which considers that the newly notified and published satellite system might interfere with its already registered radio frequencies is entitled to object to the registration of the later satellite system. In such cases, the notifying State may ask for coordination with the objecting State. The purpose of this advance publication is to give other States the possibility of looking at the information and communicating with the publishing State within four months if they think there is a risk of interference.[21]

2. Inadequacy and abuse of the ITU regulatory regime

The current system of orbit and frequency allocation for space services has been initiated by the 1963 ITU Extraordinary Administrative Radio Conference and has been continued by other ITU conferences without any significant change. Now the ITU's rules and procedures are considered to be inadequate and have proved to be outdated to meet the needs of the nations in the 21st century.[22] Because of its inadequacy, the ITU regulatory regime has also been abused during the past few years due to the increase in demands and competition among users. The ITU is not a supranational organization and remains unable to enforce its regulations over the sovereign States.

(a) Frequency/Orbital Congestion and "Paper Satellites"

Among all the problems relating to the international management of radio frequencies and orbits, perhaps the most important one is the frequency/orbital congestion, particularly in the Asia-Pacific region.

The right to use radio frequencies and orbital positions results from their registration with the ITU and not from the actual placing of a satellite in the orbit. Since this right is mostly acquired on the "first-come, first-served" basis, a number of States have been rushing for filing early registrations with ITU, often without any serious plans for the acquisition and launch of their respective satellites. [23] This problem of the so-called "paper satellites" is serious as it creates orbital congestion, which adversely affects the access and use of the geostationary orbit and imposes an obligation of coordination for the late comer States. Because of the excessive filings,

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[20] Arts. 8.1 and 8.3 of ITU Radio Regulations.

[21] Art. 9.3 of ITU Radio Regulations.

[22] "The emergence of new wireless applications, introduction of advanced systems and effective convergence of radio technology are challenging the established rules and practices in spectrum management at national and international levels": *ITU Council Working Group on the World Summit on the Information Society*, ITU Document WG-WSIS 7/12-E, 3 December 2004.

[23] Generally see, F. Lyall, "Paralysis by Phantom: Problems of the ITU Filing Procedures" (1996) Proceedings of the Thirty-Ninth Colloquium on the Law of Outer Space, 187; "Divergent Views Remain on How to Solve 'Paper' Satellite Problems" *Satellite Week* (9 September 1996); "Export Licensing and Orbital Slots Top Satellite Issues for 1999" *Satellite Week* (8 February 1999).

currently the ITU registration processing system is seriously clogged as it takes about three years for an application to get processed and costs the ITU extensively. [24]

In order to reduce the registration of "paper satellites", ITU has adopted the following three measures: (i) reduction in time for bringing into use the registered satellite systems; (ii) administrative due diligence requiring each State to provide evidence of seriousness of its intention of establishing a satellite network, and (iii) financial due diligence imposing "filing fee" on the notifying country in order to recover the ITU's application processing costs.

(i) *Reduction in Time for Bringing into Use Satellite Systems*

Earlier there was no specified period between the submission of the advance publication information and the date of bringing into use of the registered satellite system. This allowed States to hoard the registered radio frequencies and orbital positions continuously without any fear of loosing them. Recently the ITU has adopted a principle of 'use it or loose it'; thus the Radio Regulations impose the time limitation of seven years before which the registered assignments must be put to use.[25] "Any frequency assignment not brought into use within the required period shall be cancelled by the [Radiocommunication] Bureau after having informed the administration at least three months before the expiry of this period."[26] However, the ITU Radio Regulations do not place any limitation of time for States to continue occupying radio frequencies and orbital slots after they have started using them.

(ii) *Administrative Due Diligence*

Administrative due diligence is a requirement for each State to provide evidence of seriousness of its intention of establishing a satellite network.[27] Specified information is needed

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[24] "Satellite interference: still a problem", Telecom Asia, Mar 7, 2006, available at http://www.telecomasia.net/telecomasia/article/articleDetail.jsp?id=310993 (date accessed: 05-Jun-06): "The ITU's frequency coordination process isn't much faster, with some requests reportedly backlogged by up to three years."

[25] Art. 11.44 of ITU Radio Regulations.

[26] Art. 11.44 of ITU Radio Regulations before revision by the WRC-03 specified: "The notified date of bringing into use of any assignment to a space station of a satellite network shall be no later than five years following the date of receipt by the Bureau of the relevant information under No. 9.1. The notified date of bringing into use may be extended at the request of the notifying administration by not more than two years, only under the conditions specified under Nos. 11.44B to 11.44I. Any frequency assignment not brought into use within the required period shall be cancelled by the Bureau after having informed the administration at least three months before the expiry of this period". See also, Art. 5.3.1 of Appendix 30, (as modified by the WRC-03).

[27] Art. 9 of ITU Radio Regulations, footnote 4, makes Resolution 49 (Rev.WRC-2003) applicable to satellite networks and satellite systems that are subject to this Article. ITU, *Administrative Due Diligence Applicable to Some Satellite Communication Services,* ITU Res. 49, Annex 2, World Radiocommunications Conference. Res. 49, Annex 2, calls for the inclusion of the following information :

(A) Identity of the satellite network: (a) Identity of the satellite network; (b) Name of the Administration; (c) Country symbol; (d) Reference to the advance publication information …; (e) Reference to the request for coordination; (f) Frequency band(s); (g) Name of the operator; (h) Name of the satellite; (i) Orbital Characteristics.
(B) Spacecraft Manufacturer: (a) Name of the spacecraft manufacturer; (b) Date of execution of the contract; (c) Contractual "delivery window" [planned period, beginning and end dates]; (d) Number of satellites procured.
(C) Launch Services provider: (a) Name of the launch vehicle provider; (b) Date of execution of the contract; (c) Anticipated launch or in-orbit delivery window; (d) Name of the launch facility; (e) Name and location of the launch facility. In 1998, the RB published a letter for all member States with a form to be filled in order to comply with the administrative due diligence provisions. Furthermore, it gave instructions to the States to include the relevant data. ITU, Radiocommunication Bureau, *Forms for use when submitting the administrative due diligence information to the Radiocommunication Bureau*, ITU Circular Letter CR/96, Forms RS49 (1998). This document specifies more the required information indicated above. For example, relating to the information of the satellite network, it requires

to be supplied to the ITU's Radiocommunication Bureau (RB) in order to demonstrate the seriousness of the intention. The Radio Regulations provide that before the coordination process or the notification to the ITU, a State must "send to the Bureau a general description (i.e. the characteristics of the system as listed in Appendix 4) of the network or system for advance publication in the International Frequency Information Circular (BR IFIC) not earlier than seven years and preferably not later than two years before the planned date of bringing into use of the network or system."[28] It is believed that the furnishing of such precise information might deter States to register with ITU the so-called "paper satellites."

(iii) *Financial Due Diligence - Cost Recovery*

Excessive filing of notifications for registrations with the ITU is costing the organization dearly. Thus the ITU has stated implementing its approach of charging processing fees for satellite filings, which is a market mechanism in line with the "user-pay" principle; so that ITU is in a position to recover administrative expenses from the users of radio frequencies and orbital positions. The requirement of processing charges is to be applied to all satellite filings received by ITU after 7 November 1998.[29] For this purpose, the ITU Council has established a schedule of fees, for various classes of satellites network filings.[30] However, the adoption of exact amount of changes or methodology for calculation of changes is proving difficult. The charging methodology used in the Council Decision 482 on the "implementation of cost recovery for satellite network filings" was based on the number of published pages in a special section of the Radiocommunication Bureau's Weekly Information Circular. In 2002, the Council considered a new charging methodology based on the product of specific components of a satellite network filing notice (e.g. number of frequency assignments, number of classes of station, number of emissions). Due to concerns about the charges applicable under the new methodology, the Council could only adopt it on a provisional basis, while being studied further by the ad hoc Group on Cost Recovery for Satellite Network Filings.[31] The ITU is struggling without much success to come up with generally acceptable methodology and scale of charges for the cost recovery of the processing of space notices from each applicant.[32]

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some technical information, such as the nominal orbital longitude, the inclination angle, the apogee, perigee, the number of satellites, and the number of orbital planes. As well, relating the launch services provider, it specifies the name of the locality by which the launch facility is known or in which it is located, the country, and the geographical coordinates.

[28] Art. 9.1 of ITU Radio Regulations (as modified by the WRC-03).

[29] ITU, *Implementation of processing charges for satellite network filings and administrative procedures*, ITU Res. 88. ITU, *Instruments amending the Constitution and the Convention of the International Telecommunication Union (Geneva, 1992) as amended by the Plenipotentiary Conference (Kyoto, 1994)*, Final Acts of the Plenipotentiary Conference (Minneapolis, 1998), ITU, 1999.

[30] The ITU Council under Its Decision 513 on "Cost Recovery For Satellite Network Filings" (Approved at the Fourteenth Plenary Meeting), Document C03/88-E, (5 - 16 May 2003) Decided:
(a) that for filings having number of units that exceed 10 times the number of units covered by the flat fee, the following charge per excess unit should apply:
- 50% of the charge per excess unit for units above 10 times and below and equal to 20 times the number of units included in the flat fee.
- 30% of the charge per excess unit for units above 20 times the number of units included in the flat fee.
(b) that this additional methodology should be applied only to filings received before the entry in force of the Decision 482 modified by Council at its 2002 session, i.e., the date of entry in force of the "unit" charging methodology 3rd May 2002, and published after this date.

[31] See "Draft Report from the ad-hoc Group on Cost Recovery for Satellite Network Filings", ITU Document 1-E, 26 April 2004.

[32] See, Drafting Group on Charging Methodologies, "Report on Charging Methodology Options, ad hoc Group on Cost recovery for Satellite Network Filings", ITU Document 15-E, 6 May 2004.

ITU's goal for these three measures is to put financial costs and filing overflow under control. However, as noted earlier, the ITU Radio Regulations do not place any limitation of time for States to continue occupying radio frequencies and orbital positions after they have started using them. There is a possibility of abuse of privilege to use particular positions. As a dead satellite can be replaced on the same orbital position by another satellite with similar technical characteristics, this could provide the earlier operator with a "right" to use this orbital position permanently or quasi-permanently. The ITU's new regulatory measures are not resulting in any significantly shortening of the processing time and clearing the backlog of applications.[33] The ITU WRC-03 recognized that "the backlog in the processing of satellite filings by the Bureau continues to be a problem", and called for adoption of exceptional measures to enable the Bureau to absorb the backlog in the processing of satellite filings.[34]

(b) Abuse of Allocated Radio Frequencies

Due to the shortage of sufficient radio frequencies, several operators use their telecommunication satellites operating with radio frequencies, which are allocated to the Fixed Satellite Service and registered with the ITU as such, for television broadcasting (i.e. Broadcasting Satellite Services).[35] This practice is contrary to the ITU Radio Regulations[36] and results in the abuse of ITU regulatory rules. Moreover, it further decreases the availability of already scarce radio frequencies.[37]

(c) The ITU Lacks Enforcement Powers and Mechanisms

The above mentioned process of coordination is merely a bilateral negotiation between States as both States may "endeavour to cooperate in joint efforts to resolve any difficulties, with the assistance of the [Radiocommunication] Bureau, if so requested." [38] Therefore, the

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[33] According to the Report of the Chairman of the Satellite Backlog Action Group (SAT-BAG) on WRC-03 Actions" to the ITU Council, "there has been an increase in the number of notices for satellite network filed during the period of the Conference (WRC-03). Whether this increase in the number of notices received represents the beginning of a general upturn in the number of networks received is probably too early to determine, but initial indications suggest the recent trends, of reducing numbers of filings received, may continue. The improvement in the rate of processing by the Radiocommunication Bureau is continuing and should result in the elimination of the backlog by early 2004. However, this situation may not be relied upon to continue and further work is necessary to address the complexities that remain in the regulatory provisions. The Council may wish to consider steps to ensure that the work necessary to implement the relevant Resolutions from WRC-03 is undertaken in order to achieve the identified improvements." ITU Document C04/2-E (26 February 2004).

[34] WRC-03 Resolution [Com4/9] (WRC-03) on "Backlog in Satellite Filings".

[35] For details, see M.Y.S. Prasad, "Space-Based Telecommunications including Tele-Education & Telemedicine – Implications to the Area of Space Law", in Proceedings of the Space law conference 2005: Bringing Space Benefits to the Asian Region, held on 26-29 June 2005, Bangalore, India, page 4.3 et seq.

[36] Articles 4.2 and 4.3 of Radio Regulations oblige all ITU Member States to assign radio frequencies to their satellites (space stations) "in accordance with the Table of Frequency Allocations and other provisions of these Regulations." Moreover, Article 4.4 of the Regulations emphasizes that "Member States shall not assign to a station any frequency in derogation of either the Table of Frequency Allocations ….. or the other provisions of these Regulations."

[37] For details, see Ram Jakhu, "Comments on Mr. M.Y.S. Prasad's Paper on Space-Based Telecommunications including Tele-Education & Telemedicine – Implications to the Area of Space Law", in Proceedings of the Space law conference 2005: Bringing Space Benefits to the Asian Region, held on 26-29 June 2005, Bangalore, India, page 4-33 et seq.

[38] Art. 9.5B of ITU Radio Regulations.

intervention of the Bureau is not automatic. If, after all the consultations between the States and after the Bureau's recommendations the disagreement remains unresolved, "the Administration which requested coordination shall … defer the submission of its notice of frequency assignments … for six months."[39] Therefore, the ITU's Radiocommunication Bureau does not have much authority. At the end, the principle of "first-come, first-served" regulates the problem, and the State which registered its system first has no legal obligation to coordinate with, nor to accommodate, the later-comers.

(d) ITU's Inability to Settle Disputes over Orbital Positions

During the 1970's, Canada and Australia decided to launch their geostationary telecommunications for the purpose of occupying strategically located positions from where nation-wide services could be provided. Due to the rush for appropriate orbital positions, India and Indonesia faced difficulties in securing appropriate orbital positions for their first domestic satellites. Recently, because of high economic benefits, competition for scarce orbital positions has resulted in serious disputes. The followings are some of the latest examples of such disputes-concerns in the Asia Pacific Region:

(i) Since 1992, Indonesia and Tonga have been disputing the use of an orbital position that was already registered by Tonga with the ITU. Controversy continued to become so serious that in 1997 Tonga "accused Indonesia of purposefully jamming the signals of a satellite occupying Tonga's GEO slot. The satellite in that position actually belonged to a Hong Kong company that had leased the slot from Tonga. Indonesia demanded that one of its own satellites be allowed to occupy the Tonga slot."[40] ITU remained incapable of resolving the problem, which seemed to have vanished when Indonesia's Pasifik Satellite Nusantara (PSN) company abandoned its satellite project in 1998 primarily due to the Asian financial crisis.

(ii) In 2002, Pakistan hurriedly procured an in-orbit used satellite from Hughes Global System (HGS) of the United States at a low cost of $30M for five years. After renaming it as Paksat-1, the satellite was moved to occupy the orbital position at 38 degree East that was registered with ITU by Pakistan. The procurement of this satellite seems essentially to occupy the orbital slot, the ITU registration of which was due to expire on April 19, 2003. "If this slot was not protected by bringing in a satellite and placing it there, this strategic asset and any future opportunity for Pakistan to enter the space would have been lost forever."[41] On 18th June 2006, Pakistan issued a Request for Proposals for drafting a plan to launch by mid 2010 a geostationary communication satellite called Paksat-1R to meet Pakistan's needs which still

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[39] Art. 9.64 of ITU Radio Regulations.

[40] UC Berkeley Model United Nations, "The United Nations General Assembly, Disarmament and International Security", 2006, available at http://www.ucbmunc.org/Conference/disec.pdf (date accessed: 05-Jun-06).

[41] "PAKSAT-1 Reaches Its Orbital Position" available at http://www.pakistanidefence.com/news/MonthlyNewsArchive/2003/Jan2003.htm (date accessed: 06-Mar-06). For details, also see, "The troubled history of Paksat 1. (Its also been called Palapa C1, Hughes HGS 3, & Anatolia 1!)", available able at http://www.selkirkshire.demon.co.uk/analoguesat/anatoliahistory.html (date accessed: -05-Jun-06); "Access Partnership Assists in Implementation of First Satellite Network for Pakistan," April 2003, available at http://www.accesspartnership.com/connecting-pakistan-satellite.html (date accessed: 06-Mar-06); "Paksat-1 to become operational from February 1", The Nation, 1/16/2003, available at http://www.apnic.net/mailing-lists/s-asia-it/archive/2003/01/msg00031.html (date accessed: 04-Jun-06); Salman Siddiqui, "Is Paksat-1 a vital asset or vitally useless?", February 3, 2004, available at http://www.chowk.com/show_article.cgi?aid=00003082 &channel=civic%20center (date accessed: 07-Mar-06).

remain unspecified. This implies that the rush to procure Paksat-1R seems to continuously occupying its orbital slot and to develop satellite's applications during the process of planning.[42]

(iii) As a result of serious problems relating to radio frequency coordination, Vietnam's first telecommunications satellite, VINASAT-1, which was planned to be launched in 2005, has been delayed several times.[43] Vietnam has registered with ITU the 132E orbital position. But it has been disputed by Japan and Tonga, and the negotiations, which also failed. Originally, the orbital slot was to be lost by February 2006, if not used. [44] Now it appears that "Vietnam has until the second quarter of 2008 to put a satellite into GEO before it loses rights to the orbital slot it reserved several years ago with the ITU."[45] VINASAT-1 is scheduled to be launched on an Ariane 5 vehicle in 2008. With its 20 C- and Ku-band transponders, the satellite will provide radio, television and telephone services in Vietnam and the Asia Pacific region. [46]

The ITU remained incapable of resolving these and other similar disputes.

(e) Increase in Satellite Radio Frequency Interference

Radio frequency interference is increasing to the point that it is becoming a matter of major concern for satellite operators.[47] The Satellite Users Interference Reduction Group (SUIRG) estimates that "something like 4,000 reports of interference incidents a year - with hundreds or even thousands more that are believed to go unreported."[48] Though a large majority of the cases rise in North American region, Asia Pacific counts for about 28%. The main cause for interference has been the equipment malfunction. However, interference from adjacent satellite is increasing and it counts for about 11% of the interference cases in 2006.[49] Reports from SUIRG, CASBAA and the Asia-Pacific Broadcasting Union have summed up the situation clearly; i.e. the "crowded space segments (especially in Asia)," have been the main cause for such interference, in addition to "poorly made uplink equipment, poor maintenance and lack of

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[42] See, RFPforPaksat-1RConsultancy.pdf, 18 June 2008, available at http://www.suparco.gov.pk/RFPforPaksat-1RConsultancy.pdf (date accessed: 01-Jul-06).

[43] "Vietnam Satellite Project Attracts Corporate Giants," Hanoi, Vietnam (AFP) Feb 16, 2006, available at http://www.spacemart.com/reports/Vietnam_Satellite_Project_Attracts_Corporate_Giants.html (date accessed: 01-Jul-06).

[44] "The Vietnamese are working night and day. They have to, because the project is restricted by the rights to their orbital position -- if they don't launch the satellite in February 2006, they lose their rights": "Clock ticking as Vietnam counts down to first satellite launch", HANOI (AFP) Sep 17, 2003, available at http://www.spacedaily.com/2003/030917022507.3pqdygjs.html (date accessed: 14-Mar-04). See also, "Vietnam Satellite Project Delayed over Frequency Problems", Hanoi, Vietnam (AFP) Oct 29, 2004, available at http://www.spacedaily.com/news/satellite-biz-04zzzzzzzzg.html (date accessed: 02-Nov-04); "CDI Space Security Update #21: Frequency dispute could cancel Vietnamese satellite program," Center for Defense Information, 1 Dec. 2004, available at http://www.cdi.org/friendlyversion/printversion.cfm? documentID=2706 (date accessed: 04-Jun-06).

[45] Space Security 2006, page 40, available at http://www.spacesecurity.org/SSI2006.pdf (date accessed: 05-Jul-06).

[46] Press Release, "Arianespace to launch first Vietnamese telecommunications satellite", June 20, 2006, available at http://www.spaceref.com/news/viewpr.html?pid=20129 (date accessed: 01-Jul-06). Also see, "Vietnam To Invite Formal Bids For Satellite Project", Feb 02, 2006, available at http://www.spacedaily.com/reports/Vietnam_To_Invite_Formal_Bids_For_Satellite_Project.html (date accessed: 03-Feb-06).

[47] John C. Tanner, "SPACE JAM: Fighting satellite interference from the ground up", Telecom Asia, Nov 1, 2003, available at http://www.telecomasia.net/telecomasia/article/articleDetail.jsp?id=73752 (date accessed: 20-My-06).

[48] "Satellite interference: still a problem", Telecom Asia, Mar 7, 2006, available at http://www.telecomasia.net/telecomasia/article/articleDetail.jsp?id=310993 (date accessed: 05-Jun-06).

[49] "Interference Matrix Database," Satellite Users Interference Reduction Group. available at http://www.suirg.org/interference/report_display.php (date accessed: 20-May-06).

proper training for installers."[50] It is costing significant amount of money to the operators, "particularly in a crowded market like Asia, which is served by 27 different regional and global operators, more than any other region in the world."[51]

In June 2005, Star India suspected sabotage of its signals from AsiaSat satellite which caused a disruption in the broadcast of its Indian channels including Star Plus, Star Gold and Star News. Star News Release stated that "If deliberate, the interruption seriously violated international telecommunication treaties, contravened international regulations, and was in breach of the normal conduct of satellite operations."[52] Similarly, in China AsiaSat's 3S satellite has been seriously interfered with twice (in March 2005 and November 2004) by outside signals disrupting its regular satellite television programming.[53]

The increasing demand for radio frequencies by the military purposes gives rise to satellite interference and could result in jamming or any hostile action against a particular satellite or the concerned operator or country. Moreover, "interferences from the military communication and tracking systems into satellite communications is on the increase though both services are supposed to operate in different frequency bands. ….The secrecy of military R&D and trial operations and lack of any scrutiny over sophisticated military operations for their impact to the civilian services make resolution of such interference cases very difficult."[54]

The ITU lacks mandate for the settlement of disputes related to harmful interference between two or more States. The ITU Radio Regulations establish that all States shall cooperate to find good solutions of these problems. The ITU Radiocommunication Bureau can only intervene in case a State requires its service. Moreover, the only actions that the Bureau is supposed to take at the request for cooperation of the concerned States are the analysis of the situation, and the adoption of conclusions with a recommended action, which it will send to the parties involved. Therefore, the Bureau does not have much authority. The ITU Radiocommunication Regulation Board, composed of 12 part-time members, is also a weaker body than its predecessor, the IFRB. Though the new Board is still the body to provide the last recommendations in cases of harmful interference after a report from the Director of the Radiocommunication Bureau; however, in case of a dispute, the problem would be referred to the next World Radiocommunication Conference (WRC).[55] A Plenary Meeting of a WRC addresses such cases and makes decisions mainly based on wider political considerations unrelated to the Radio Regulations. Thus, a strict application of the Rules of Procedures, of the Radio Regulations and an efficient functioning of the decision-making in the ITU are undermined.

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[50] "Satellite interference: still a problem", Telecom Asia, Mar 7, 2006, available at http://www.telecomasia.net/telecomasia/article/articleDetail.jsp?id=310993 (date accessed: 05-Jun-06).

[51] "Satellite interference: still a problem", Telecom Asia, Mar 7, 2006, available at http://www.telecomasia.net/telecomasia/article/articleDetail.jsp?id=310993 (date accessed: 05-Jun-06).

[52] "Star suspects sabotage in satellite signal disruption", Indiantelevision.com Team, 27 June 2005, Available at http://www.indiantelevision.com/headlines/y2k5/june/june305.htm (date accessed: 05-Jun-06).

[53] "Chinese broadcasting satellite temporarily attacked by outside signals", March 16, 2005, available at http://www.cdi.org/program/issue/document.cfm?DocumentID=2937&IssueID=140&StartRow=11&ListRows=10&appendURL=&Orderby=DateLastUpdated&ProgramID=68&issueID=140#6 (last visited: 05 Jun-06).

[54] M.Y.S. Prasad, "Space-Based Telecommunications Including Tele-Education & Telemedicine – Implications To The Area Of Space Law", In *Proceedings of the Space Law Conference 2005: Bringing Space Benefits to the Asian Region*, held on 26-29 June 2005, Bangalore, India.

[55] Article 14, the Constitution of the International Telecommunication Union, as amended by the ITU Plenipotentiary Conference (Marrakesh, 2002).

3. Inadequacy of the National Regulatory Regimes

In view of a global trend towards the introduction of competition in telecommunication services, telecommunication regulatory bodies are being created in almost all countries. In the beginning of the 1990s, there were only 13 regulatory institutions, but their number in 2005 has increased to more than 120. However, a little attention is being paid to their abilities and capabilities. An ITU Regulatory Survey indicates that 75% of all regulators lack sufficient financial, human and physical staff resources. [56] In several countries in Asia, adequate telecommunication regulatory frameworks are not in place. Generally the existing legislative and regulatory instruments do not clearly specify regulator's mandate and powers to enforce its decisions and orders. At the same time, the concerned governments have not given sufficient human and financial resources to their regulators. Ill-equipped regulator can not be in a position to perform its functions. Therefore, national regulators in several countries are often slow to respond to or incapable to resolve radio frequency interference cases.[57]

D. Final Remarks and Recommendations

More and more satellites are being, and will be, placed in space. This means that there will be an increased pressure on the already scarce and extremely congested radio frequency spectrum without which no satellite telecommunications system can be operated. In the Asian region, the competition for appropriate radio frequencies and orbital positions will become fierce as the demand for telecommunications increases. Cost for accessing and using these resources to satellite operators and regulators is expected to amplify as access becomes difficult and cases of interference increase. It is also clear that the current ITU regulatory regime is outdated and will not be in a position to resolve all issues related to the use of radio frequencies and orbital positions. The ITU's WRC-07 is expected to address "options to improve the international spectrum regulatory framework based on the examination of the effectiveness, appropriateness and impact of the ITU Radio Regulations with respect to the evolution of existing, emerging and future applications, systems and technologies."[58] I do not expect any significant improvement in the current regulatory regime. In my opinion, what is needed is to expand the role and authority of ITU more as an international telecommunication regulator with compulsory settlement of dispute mechanism, rather than its continuation as an international consultative organization.

It is also imperative that the States of the Asian region cooperate and devise new regulatory rules for accessing and using radio frequencies and orbital positions, both at international and national levels. It is recommended that the following key specific initiatives should be taken by the Asian countries:

1. Region 3 Member States of the ITU should adopt a flexible allotment plan for some specific services and radio frequency bands for their equitable distribution by setting up detailed rules and procedures for their use of radio frequencies and orbital positions. This regional plan should be incorporated in the ITU Radio Regulations at an appropriate time to make it applicable to all ITU Member States.

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[56] http://www.itu.int/newsroom/press_releases/2002/05.html (accessed: 24 April 2002).
[57] "Satellite interference: still a problem", Telecom Asia, Mar 7, 2006, available at http://www.telecomasia.net/telecomasia/article/articleDetail.jsp?id=310993 (date accessed: 05-Jun-06).
[58] *ITU Council Working Group on the World Summit on the Information Society*, ITU Document WG-WSIS 7/12-E, 3 December 2004.

2. In cooperation with the Asia Pacific Satellite Communications Council,[59] Association of Southeast Asian Nations,[60] the Satellite Users' Interference Reduction Group (SUIRG),[61] and other interested parties, Asian States should set up a regional independent interference monitoring and dispute settlement rules and system.

I make these recommendations in the context of the theme of this Conference: i.e. "Asian cooperation in space activities: a common approach to legal matters". In my opinion, unilateral technical initiatives alone and the continuation of the unregulated competition for the use of indispensable resources like the radio frequencies and orbital positions will NOT serve the interests of all nations in the region. I believe that the adoption of the above suggested and similar other cooperative steps are imperative in order to make the required telecommunication services readily available in the Asian region.

[59] For details, visit http://www.apscc.or.kr/about/over.asp (date accessed: 06-Jul-06).

[60] *Chairman's Statement of the 11th ASEAN Summit*, "One Vision, One Identity, One Community", Kuala Lumpur, 12 December 2005, available at http://www.aseansec.org/18039.htm (date accessed: 05-Jun-06).

[61] *Satellite Users Meet on Interference Reduction*, http://www.isro.org/newsletters/spaceindia/lulsep2005/ Chapter4.htm (date accessed: 2-Jul-06).

COMMENTS ON THE DISCUSSION PAPER "REFORMING THE REGULATORY REGIMES GOVERNING TELECOMMUNICATION IN ASIA" BY PROF. RAM JAKHU

by

Prof. Toshio Kosuge
(University of Electro-Communications, Tokyo, Japan)

1. First of all I would like to express my thanks for inviting to this interesting and important Conference on the Asian cooperation in space activities jointly organized by Ministry of Information and Communication of Thailand and IISL. Especially I appreciate this opportunity to have a chance to give my short comments to Prof. Jakhu's discussion paper "Reforming the Regulatory Regimes Governing Telecommunications in Asia.

2. As we predicted in 1990s that the 21st Century would be the age for Asia Pacific Region, it is most likely to be correct and likely to develop so rapidly in economy and communication and information flow in this region. It is strongly necessary for this region to expand telecommunication and information networks domestically and internationally.

   In Asia Pacific region we could recognize the tremendous gaps among nations and domestic gap between urban and rural in telecommunication infrastructure and information flow. For example there is wide gap in total telephone density (fixed and mobile) among Asia Pacific nations, Taiwan169 and Myanmar0.86 in 2003.(1) Prof. Jakhu correctly mentioned in his discussion paper that satellite would be best means for a rapid expansion of telecommunications for particularly for mobile and thin route services in geographically difficult areas in this region like jungles and islands countries.

3. "Radio frequency bands and orbital slots are limited natural resources."
   It is commonly recognized that radio frequencies and associated orbits, including geostationary satellite orbit, are limited resources. There are more than 40 satellites out of total 160 C-band satellites and 42 out of total 120Ku-band in Asia Pacific region. Japan now uses around 24 satellites for communication and broadcasting services. In this region there grows more demands for satellite communication networks near future as mentioned in the discussion paper by Prof. Jakhu.

   I would like also mention the great feasibility and usability of satellite communication systems for bridging digital divide among the nations and in domestic divide issues. Millennium Declaration and WSIS made goals for realization of universal service and access for all the people in the world. We need definitely public service communication networks and services by all means for especially risk management, education, medical care and so on in order to bridge the digital divide and change to digital opportunity in Asia Pacific region. There would be more demands for radio frequency and orbits in rapid economic developments in this region.

   In 21st Century we are now in the age of mobile communication and we need more radio frequencies in all kinds of terrestrial and space communications. Therefore we must establish rules of equitable use of radio frequencies and orbits within the framework of international and regional cooperation and collaboration.

4. "The ITU should have more regulatory regime and function for satellite issues."
   In nearly 150 years history the ITU has developed the regulatory regime for radio frequency and orbit through international cooperation and collaboration. Even though the ITU Constitution and Convention, Radio Regulation and other recommendations have been adopted among the member states, they are still unwilling to accept restrictions on their telecommunication sovereignty for

freedom of action in use of radio frequency and orbit. WARC-Orb-85 and 88 Conferences clearly indicated strong will to hold power to assign radio frequency and orbit according to their national interests. As Prof. Jakhu mentioned in his discussion paper, The ITU made several rules and process of coordination on reduction in time for bringing into use satellite systems, avoiding "dead wood", administrative due diligence and financial due diligence. Even though there established several procedural rules on satellite communications, the ITU still could not change the basic principle of "first come, first served". We had one exceptional case against "first come, first served principle" case in Direct Broadcasting Satellite Service in WARC-BS-77. Within the framework of the ITU, it is difficult for the ITU to solve conflicts or disputes among member countries on these issues. The ITU should have more authority and power for them.

5. In the problematic situation of satellite communication in the Asia Pacific region these disputes over satellite orbital positions and radio frequency interference could be most important concerns among countries and operators in this region. Through these disputes and interferences we recognize the ITU could not solve these issues within the framework of present regulatory regime, even though satellite radio frequency interference problems are most important issues. It would be one of the keen issues for this region to elaborate any mechanism for solution of these matters for further rapid development of satellite communication networks in near future. Prof. Jakhu correctly mentioned in his discussion paper. I would like to make suggestion for regular conference on satellite communication on rules and standards commonly concerned among Asia Pacific countries for cooperation and collaboration.

   As Prof. Jakhu mentioned in his final remarks and recommendation, I agree with his idea of increasing the role and authority of the ITU as an international telecommunication regulator with compulsory settlement of dispute mechanism.

   Asia Pacific region countries as Region 3 Member States of the ITU should take the initiative role for sound and reasonable development of satellite communications in this region in cooperation and collaboration with member countries administrations and operators. We are sure that Asia Pacific region could contribute also to strengthen the role and function of the ITU in the field of regulatory and implementation mechanism just like we have done in the field of standardization.

6. In relation with above mentioned comments, I would like to raise the following issues for further discussions in this session:
   1) The ITU should have the authority to raise the fund from collecting utilization fee on radio frequency band and orbital allotment. besides financial due diligence. Many countries established domestic systems for radio frequency band. This kind of fee system could make good contribution for developing countries to gap their digital divide.
   2) To improve allotment plan for satellite radio frequency and orbit, there should have certain priority for specific services like public service satellite networks with international cooperation to implement universal service. In Asia Pacific region it is very important for all the people could access to those public service telecommunication networks among quite wide variety of different stages of development.
   3) After 20years of "Missing Link" was publicized, we could not manage to reach the goal for every one in the world to access to the telephone within the walking distance. What kind of legal frame work and policy should be elaborated for facilitate satellite communication networks for Asia Pacific region to bridge digital divide?
   4) What kind of international cooperation and collaboration should be appropriate for this region in communication satellite network? Joint operating agency for pubic telecommunication like EUTELSAT, regional cooperation in developments of satellite communication networks, technical cooperation etc.

Thank you very much for you kind attention.

COMMENTS ON THE DISCUSSION PAPER ON "REFORMING THE REGULATORY REGIMES GOVERNING TELECOMMUNICATIONS IN ASIA" BY RAM JAKHU

by

Sethaporn Cusripituck[62]

A. INTRODUCTION

It is my deep honor to be invited as a commentator of this very informative paper. The paper reviews a current situation of satellite communication regulatory regimes, especially the International Telecommunication Union (ITU) regulatory regimes. The information given with references is very useful for further study and research.

This paper is well developed by first reviewing a current demand on radio frequencies and orbital slots, which are the essential tools for satellite communications, and then searching for possible solutions by studying the ITU regulatory regimes. From the study, it is found that there are inadequacy and abuse of the ITU regulatory regimes and also inadequacy of the national regulatory regimes. The author finally proposes the key recommendations that should be followed in the context of cooperation at the end of this paper.

B. COMMENTS ON PROBLEMATIC SITUATION

In part B of the paper, the author investigates the situation of satellite communications by focusing on the two essential tools for their operation. Satellite communications need the radio frequencies and orbital slots, which are limited resources and are international in their legal status. Therefore, there is a strong international competition for the use of these scarce resources.

I do agree with the author's investigation, as the number of satellites owned by Asian countries at present increases. For example, Japan has 36 satellites, China has 33 satellites, Thailand has 5 satellites, Indonesia has 4 satellites, Malaysia has 3 satellites, South Korea has 3 satellites, and the Philippines has 1 satellite[63]. Because there is a great demand on satellite communications, the use of radio frequencies also increases dramatically. In the past, only C-band and Ku-band were widely used by communications satellites. Now the use of frequencies by these satellites expands to Ka-band, for example, THAICOM 4 (commercially known as iPSTAR) is one of those satellites. Furthermore, by sending filing to ITU[64], many satellites plan to use L-band, S-band and X-band to serve a future demand.

C. COMMENTS ON SEARCH FOR SOLUTIONS

In this part, I totally agree with the author concerning the weak point in ITU regulatory regime. It has

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[63] http://www.ucsusa.org/global_security/space_weapons/satellite_database.html

[64] www.itu.int/ITU-R/space/index.html

been shown that the spectrum and orbital slots are limited and scarce resources. ITU Constitution and Convention and the Radio Regulation attempt to assure that these resources are fair distributed and equitable access. The ITU Member States are obliged to limit their uses to the minimum necessity and rational usage. However, the "equitable access" cannot come true because of unequal in the technical and financial potential of each States. Subsequently, ITU find out the solution for "equitable access". The "Planned Band" of radio frequencies and orbital slots are distributed to all States to guarantee that all States have equal right on hand. However, the "Planned Band" is ineffective and inflexible in practical term.

On the other hand, the States still have their rights to design their own system with particular radio frequencies and orbital slots. The classic method, "First-Come First-Served", remain validly. The States which intend to launch satellites required to notify their registration for the purpose of harmful interference protection. The right to registration results in the problem of orbital congestion. Many states attempt to make reservations for orbital but not all are intended to launch respective satellites. "Paper Satellite"[65] increases dramatically and causes hard workload to ITU. Three methods, (i) reduction date of bringing into use time, (ii) administrative due diligence, and (iii) cost recovery have been adopted to relieve "Paper Satellite" problem. However, the current ITU regulations are inadequate and provide the gap in misuse.

Telecommunications regulator of Thailand, National Telecommunications Commission, which was borne late in 2004, is currently in the process of opening up the facility-based satellite telecommunication service market for competition. Process has already been started to create relevant rules and regulations with the intention of putting them into force next year. Hence the incumbent will end its monopoly of more than a decade over the domestic market.

In the pass, we have accumulated more than our share of experience in "searching for solution" concerning spectrum and orbital position under current framework which emphasizes bilateral effort and plays down ITU's. With market opening coming soon , we obviously hope that such experience will be avoided so that satellites of our new player can begin their journey of competition , without too much hindrance even before they fly.

D. COMMENTS ON PAPER KEY RECOMMENDATIONS

The author proposes key recommendations that should be followed in the context of regional cooperation in the Asian region as follows:

- Asian members should adopt a flexible allotment plan for some services and radio frequency bands by setting up rules and procedures.
- Asian members should set up a regional independent interference monitoring and dispute settlement rules and system, in cooperation with the Asia Pacific Satellite Communications Council (APSCC), Association of Southeast Asia Nations (ASEAN), the Satellite Users Interference Reduction Group (SUIRG), and other interested parties.

I agree with the concept of the first recommendation. Not only the need of frequencies to serve the expansion of telecommunications infrastructure, but also the convergence of telecommunication services, requires a flexible plan. As we are moving into a converging and demanding world, telecommunications regulators should carefully develop policies, rules and procedures that are suitable for such changes. The

[65] Information from www.itu.int shows that South Korea has notified 48 filings, China 151 filings and Japan 213 filings. Nevertheless, South Korea launched only 3 satellites, China launched 33 satellites and Japan launched 36 satellites.

recommendation is reasonable and good; however, it is not clear on how to set up rules and procedures or even on what kinds of rules and procedures that is suitable for the mentioned flexible allotment plan. Examples would give readers more ideas on this recommendation.

The second recommendation is an interesting issue. Currently, cooperation among countries regarding interference monitory is already implemented, but there is no regional independent interference monitoring and dispute settlement rules and system, as proposed in this paper. The mentioned parties in the paper are a collection of satellite and policy related entities, including government ministries and agencies, private and public companies, and academic and research entities. APSCC is a non-profit international association representing all sectors of satellite/space related industries. APSCC serves to connect various groups in satellite/space industries in the Asia-Pacific region and seeks to develop and foster projects of benefit to the industries as a whole. SUIRG is a collective voice from satellite industries, dedicated to combating the increasing and costly problem of satellite radio frequency interference. ASEAN is another party that can help strengthen the cooperation among countries in this region on satellite issues.

The concept of this second recommendation may proceed with the help from the Asia-Pacific Telecommunity (APT)[66]. Since APT has a role in strengthening international cooperation among APT members and has to ensure balanced development of telecommunication services, cooperation through APT may be one possible alternative. In addition, ITU Regional Office for Asia and the Pacific should play a role on this issue in order to support the cooperation between ITU members and to be the contact point between ITU head office and Asian countries.

E. SPECIAL COMMENTS

At present, ITU memberships are of 2 categories:

- Member States
- Sector Members

As the author rightly points out in the paper that there exist 120 regulatory institutions in 2005, Regulator is a new breed of body in the area of telecommunications and is highly relevant in rules and regulations. ITU needs to co-opt them to function better, not the least in satellite.

I therefore suggest that a new membership category be created for Regulator, after Member States.

F. CONCLUSION

In conclusion, I really appreciate this paper as a very informative and comprehensive document. Facts and ideas are clearly presented in logical structure. Moreover, all references have been made as necessary with reliable sources. I have added some information from my experience to support this paper and also little comment to unclear point. I strongly believe that, after revising, this precious paper will be valuable for all related parties.

[66] www.aptsec.org

Session 2

National Space Legislation: Developments in Asia

NATIONAL SPACE LEGISLATION, WITH REFERENCE TO CHINA'S PRACTICE

by

Yun ZHAO*

1. Introduction

Laws provide basic means to regulate our daily life. It is important in the sense that laws offer guidelines for human activities and define illegal actions and possible penalties. In modern legal society, human beings will always need to check and rely on laws to decide their actions. As a result, lawyers and legislators are keen in filling in new rules wherever and whenever new activities arise and new developments are made. Space legislation started only after the launch of Sputnik in 1957 and has since then achieved great success in regulating space activities.

Five space treaties drafted in the 1960s and 1970s provide important guidance to space activities; [1] however, the year 1979 marked the end of international space legislation.[2] Since then, discussions have been carried out in various forums concerning the necessity and possibility of further international legislation. The United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS), represented by 67 nations, failed to adopt new rules in view of the conflicting views expressed by different nations.[3] It is accepted that the best way is to simply clarify certain terms and provisions in the existing treaties. While not favoring the adoption of new treaties, the UNCOPUOS encouraged ratification of the existing treaties and emphasized the importance of national space legislation.[4]

Against such a background, it is now time to examine the issue on national space legislation: its necessity, feasibility and means. To that end, Part 2 of this paper will discuss the

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[1] Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, London/Moscow/Washington, done January 27, 1967, entered into force October 10, 1967; 610 UNTS 205; TIAS 6347; 18 UST 2410; UKTS 1968 No. 10; Cmnd. 3198; ATS 1967 No. 24; ILM 386 (1967) (hereinafter "Outer Space Treaty); Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, London/Moscow/Washington, done April 22, 1968, entered into force December 3, 1968; 672 UNTS 119; TIAS 6599; 19 UST 7570; UKTS 1969 No. 56; Cmnd. 3786; ATS 1968 No. 8; 7 ILM 151 (1968) (hereinafter "Rescue Agreement"); Convention on International Liability for Damage Caused by Space Objects, London/Moscow/Washington, done March 29, 1972, entered into force September 1, 1972; 961 UNTS 187; TIAS 7762; 24 UST 2389; UKTS 1974 No. 16; Cmnd. 5068; ATS 1975 No. 5; 10 ILM 965 (1971) (hereinafter "Liability Convention"); Convention on Registration of Objects Launched into Outer Space, New York, done January 14, 1975, entered into force September 15, 1976; 1023 UNTS 15; TIAS 8480; 28 UST 695; UKTS 1978 No. 70; Cmnd. 6256; ATS 1986 No. 5; 14 ILM 43 (1975) (hereinafter "Registration Convention").

[2] Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, New York, done December 18, 1979, entered into force July 11, 1984; 1363 UNTS 3; ATS 1986 No. 14; 18 ILM 1434 (1979) (hereinafter "Moon Agreement).

[3] Proceedings of the United Nations/Republic of Korea Workshop on Space Law: United Nations Treaties on Outer Space: Actions at the National Level, Office for Outer Space Affairs, United Naitons Office at Vienna, ST/SPACE/22, 137-139 (New York, 2004).

[4] UNCOPUOS organizes workshops in different regions annually to encourage the States to legislate national space laws. Such workshops have been held since 2002 in the Netherlands, Korea, Brazil and Nigeria.

necessity, aims and objectives of national space legislation. By recognizing the importance of national legislation, Part 3 continues to examine basic principles and means to be followed in national space legislation. As a major space-faring country, China has been slow in national space legislation. The ambitious plan to reach out to the Moon and other space projects in China has called for an urgent need for national space legislation. Part 4 of the paper rightly selects China as an example to elaborate on the present and future of national space legislation. The paper concludes that national space legislation is the main tool in regulating space activities in view of the inefficient mechanism of international space legislation and that national space legislation shall provide a direct and efficient means to regulate and promote space activities.

2. Necessity of National Space Legislation

2.1. National Legislation *vs.* International Legislation

Various articles and books have thoroughly discussed issues surrounding international space law, namely the five international space treaties.[5] With the exception of the 1979 Moon Agreement, the other four treaties enjoy wide recognition. Some principles in the treaties have been widely considered as international customary law: even if not a Member to the treaty, States are obliged to comply with the obligations arising from its provisions.[6] Such principles include non-appropriation of and free access to outer space,[7] and peaceful use of outer space.[8]

International space law plays an important role in regulating space activities. During the years when most nations did not have national space legislation, these treaties were the only source of written rules to rely upon. It is without doubt that these space treaties will continue to be one of the most important sources of space law.

These five treaties came into being in the first 25 years of space exploration. With the rapid development of space technology and the emergence of new space activities in the last 25 years, it would have been natural to have formulated more new rules and regulations. However, the reality is that no new treaties have been drafted or adopted afterwards. Does that mean that the existing treaties sufficiently resolve the problems arising out of new activities?

The answer is negative. One may refer to the discussions on the application of the term "launching state". Difficulties arise with the issue of registration and liability when a satellite is transferred to a non-launching state.[9] No firm decision has been made concerning the issue, however, the United Nations General Assembly (UNGA) issued a Resolution recommending States to consider enacting and implementing national laws authorizing and providing for

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[5] See for example, Ty S. Twibell, Space Law: Legal Restraints on Commercialization and Development of Outer Space, 65 *University of Missouri at Kansas City Law Review* 593-600 (Spring 1997).

[6] Vladlen S. Vereshchetin & Gennady M. Danilenko, Custom as a Source of International Law of Outer Space, 13 *Journal of Space Law* 32 (1985).

[7] Paul G. Dembling & Daniel M. Arons, The Evolution of Outer Space Treaty, 33 *Journal of Air Law & Commerce* 456 (1967).

[8] Barry J. Hurewitz, Non-Proliferation and Free Access to Outer Space: The Dual-Use Conflict between the Outer Space Treaty and the Missile Technology Control Regime, 9 *High Technology Law Journal* 220 (1994).

[9] For further discussion, see A/RES/59/115 (25 January 2005), at 2. Dr. Tennen argued that the legal framework, including the requirement for states to authorize and supervise national activities in space and the provisions regarding liability for damages, will ensure significant protection to private entities, and will safeguard the future of space commerce rather than hamper it. See IISL/ECSL Space Symposium 2004: "New Developments and the Legal Framework Covering the Exploitation of the Resources of the Moon".

continuing supervision of the activities in outer space of non-governmental entities under their jurisdiction.[10] While as a main forum for discussing the development of space law, the UNCOPUOS has faced difficulties in formulating new rules in view of the sheer large number of Members increasingly involved in space activities and the imbalanced development among those States. With no other better means available, national space legislation is believed to be viable in providing a regulatory framework for space activities in the present age.

2.2. Aims and Objectives of National Space Legislation

Most obvious to all, national space legislation adds to the element of legal certainty and transparency. A legal society is governed by laws, which set out basic guidance on relevant activities. Potential actors could have the opportunities to evaluate their actions to be taken and formulate a full picture of possible results arising out of such actions. The aim to improve legal certainty and transparency is common to all national legislation. However, with regards to national space legislation, further development in terms of other detailed aims and objectives may be desirable.

2.2.1. Providing a Supervisory Framework for Space Activities

As recommended by the UNGA, national space legislation provides a supervisory framework for space activities. This also constitute the aim and objective of utmost importance for national space legislation. The five treaties were drafted in the cold-war period when States were the sole body carrying out space activities. This situation drastically changed with private parties increasingly becoming involved in space activities. The Outer Space Treaty provides for a duty of authorization and continuing supervision and the international responsibility of national activities in outer space, including those carried out by non-governmental entities.[11] However, different understandings exist for the term "national activities".[12] Would it be appropriate to hold a State responsible if the activity were carried out by a private entity without the knowledge of the State? If not, for what type of national activities shall a State be held responsible for?

The Outer Space Treaty further provides that a State is internationally liable for damage to another State or its natural and juridical persons.[13] Such a State, to satisfy the element of control and jurisdiction, is limited to four types in the Liability Convention: a State which launches the space object, procures the launching of the space object, from whose territory the launching of the space object occurs, or from whose facilities the space object is launched.[14] Recent practice has caused doubts on the above limitation. In case the ownership of a space object is transfer to a non-original launching state, it would appear ridiculous that the original launching state is still held liable and that the transferee with full control and jurisdiction of the space object is not liable.

While no consensus was reached on the issues above, the Members agree that private entities shall register with and be licensed by the States in the initial stage and that the States

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[10] *Id.*
[11] Outer Space Treaty, Art. 6.
[12] Frans G. von der Dunk, Heeding the Public-Private Paradigm: Overview of National Space Legislation around the World, *2004 Space Law Conference Paper Assemble*, Beijing, China April 25-27, 2004, China Institute of Space Law, at 22.
[13] Outer Space Treaty, Art. 7.
[14] Liability Convention, Art. 1(c).

themselves shall be the first safety valve in regulating the activities of private entities through the license procedure.[15] States should formulate licensing rules when granting these private entities license to carry out space activities. By licensing an entity to carry out some activities implies that the licensing State shall continue to undertake its supervisory task and make sure that such activities be carried out in accordance with its international obligations. Ignorance of private space activities shall thus not constitute a valid reason for a State to absolve from possible responsibility and liability. Consequently, national space legislation shall serve as a supervisory framework for space activities and provide clear guidance on the issue of international responsibility and liability.[16]

2.2.2. Legal Obligation to Abide by International Treaty

According to international law, States party to a treaty are under a duty to implement the terms of that treaty within their national legal system.[17] The five space treaties constitute the most important legal source for those who are intending to carry out space activities. As mentioned above, except for the Moon Agreement, the other four treaties have been accepted by many States. National legislation is one important means to implement international commitments. As defined in these international treaties, the State shall be directly held liable or responsible for certain national space activities conducted by non-governmental entities. It is thus important to create a feasible structure to elaborate on the situations when and where States will be held liable. The treaties do not go further into detailed rules on the implementation. Consequently, a State, no matter whether it automatically accepts international treaties as domestic law, shall need to enact clear and detailed national rules. In the case where there is a necessity to transform international treaties into domestic law, the State is implementing its international obligation by national legislation. In the case where international treaties are directly applicable, the State can further concretize the ways to implement the treaties through national legislation.

2.2.3. Promotion of commercialization and Involvement of Private Entities

Private entities are increasingly interested and involved in space activities in view of the rich natural resources in outer space and potential profits out of space exploration. Outer space is no more a State-monopolized area. However, the space treaties were drafted when States were the only player in outer space. No consideration had actually been made as to the commercial side of space activities. So far no clear rules have been made to property rights; no agreements have been reached concerning the application of the term "Common Heritage of Mankind".[18] With all these legal issues pending, potential investors will be hesitant, which is devastating to the healthy development of outer space.[19]

In view of the stagnant stage in international space legislation, national legislation shall be the only way to formulate rules in regulating new space activities. Compared with

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[15] United Nations/Republic of South Korea Workshop on Space Law, held in Daejon, November 3-6, 2003, available at <http://www.oosa.unvienna.org/index.html>.
[16] Peter van Fenema, The Unidroit Space Protocol, the Concept of 'Launching State', Space Traffic Management and the Delimitation of Outer Space: The 41st Session of the UNCOPUOS Legal Subcommittee, Vienna, 2-12 April 2002, 28 *Air & Space Law* 277-279 (September 2002).
[17] Statement by the Board of Directors of the International Institute of Space Law (IISL) on Claims to Property Rights Regarding the Moon and Other Celestial Bodies, IISL.
[18] Charles C. Okolie, *International Law of Satellite Remote Sensing & Outer space* 42 (Kendall/Hunt, 1989).
[19] Ezra J. Reinstein, Owning Outer Space, 20 *Journal of International Law & Business* 72-74 (Fall 1999).

international legislation, national legislation is more flexible and more easily enacted. Witnessing the rapid development of space technology and irreversible trend of space commercialization, States should promptly act to fill in the legal vacuum of outer space. A stable and reasonable legal environment will procure economic returns and add confidence for potential space investors in making investment in outer space.

2.2.4. Optimization of the Utilization of Outer Space

Outer space is full of opportunities; lacking a clear legal framework, however, shall prevents potential interested parties from taking actual steps in realizing full economic and technological gains. The International space legislation process is more complicated than national legislation. It requires consensus from various political bloc; political, economic, military, strategic considerations are involved in the legislation process. National legislation, comparatively simpler, could take initiative in making new rules for the use of outer space; furthermore, national legislation could, based on its own national background, make rules liberal enough to allow for various means to realize the full benefits from the exploration of outer space.

Australia's Space Activities Act 1998 (Amendment 2002) (hereinafter "the Act") provides an excellent example. While recognizing that there is no internationally accepted or delimitation of the term "outer space", the Act replaced the term with the phrase "an area beyond the distance of 100 kilometers above mean sea level".[20] Opportunities were provided for the international society to provide feedback on the replacement. It does not matter much whether this above position on the border of outer space is acceptable by other nations; what matters is that States are starting to seriously deal with undefined matters at the national level. This process can serve as a testing bed for future international legislation. Accordingly, international legislation, though lagging behind, should not obstruct the utilization of outer space; national legislation functions as an impetus for the utilization of outer space and transitional period between legal vacuum and international regulation.

3. Principles and Means of National Space Legislation

National space legislation has never been so important before. The rapid development of space activities and the difficulty in applying the existing space treaties has constituted valid claims for national legislation. It is not the time to discuss whether there is a necessity of national legislation; it is time to discuss when and how to legislate. Sound and sustainable development of space activities largely depend on an accountable legal framework at the national level, if not formulated in the international arena.

3.1. Principles for National Space Legislation

3.1.1. International Treaties and Existing National Space Legislation as a Basis and Guidelines

Without a doubt, international treaties, more specifically the existing space treaties, should serve as the starting point for national legislation. The principles and rules in those

[20] United Nations General Assembly, Committee on the Peaceful Uses of Outer Space: National Legislation and Practice relating to Definition and Delimitation of Outer Space, Note by the Secretariat, Addendum, March 20, 2006, A/AC.105/865/Add.1, para. 5.

treaties offer a basis and useful guidelines. State parties undoubtedly have the obligation to put those rules into implementation.[21] Rules which have constituted part of customary international law also bind all other members. Even rules which do not form part of customary law should be useful in securing the consistency of space rules around the world and avoiding possible conflicts. Particular references should also be made to the existing national space legislations and successful experiences, especially those of the United States (US), which have been rather advanced and complete.

As defined by international treaties, the State should undertake international responsibility and liability for national space activities. By transforming international treaties into national law, the State can show its commitments to the international treaties and sincere undertakings in securing the actual obligations of continued supervision and indemnification in the case of personal death or injury, loss or damage of relevant properties.

All in all, national space legislation should be able to reflect the principles inscribed in international treaties and concretize those principles in good faith. With respect to the issue of international responsibility and liability, the implication of national legislation should be extended, beyond simple transformation of international treaties, to demonstrate in details how to deal with international issue against the national background.

3.1.2. Balance between International Obligation and National Interests

Development of space activities is extremely imbalanced around the world. For some time, outer space was monopolized by two superpowers. Such monopoly was broken when more and more States became space-faring nations.[22] But those nations differ in the level of development. Different needs resulted from practical application in different nations will ask for national legislation to be based on the actual national circumstance. National space legislation, while guided by the uniform international space treaties, should differ taking into account national interests, the stage of social and economic development, national legal tradition and the exact nature of space activities carried out by the State concerned.[23] Russia has developed its single omnibus law to further its national interests including economic development, national security and dominance in outer space; as declared by the Law of the Russia Federation on Space Activity 1993, the goal and purpose of the law is to promote the well-being of the citizens of the Russian Federation, develop the Russian Federation, ensure its security and solve the global problems of mankind.[24]

National space legislation, while not defeating the main aims and objectives, should be adapted to the national needs. For example, in developing the national licensing regime for space activities, the States shall consider factors such as the protection of public health and safety, property and the environment, including limited natural resources.[25]

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[21] Antonio Cassese, *International Law*, 2nd Edition, 217-218 (Oxford University Press, 2005).
[22] Glenn H. Reynolds & Robert P. Merges, *Outer Space: Problems of Law and Policy* 231 (Boulder: Westview Press, 1989).
[23] United Nations General Assembly, Committee on the Peaceful Uses of Outer Space: Report on the United Nations/International Institute of Air and Space Law Workshop on Capacity-Building in Space Law, The Hague, November 18-21, 2002, A/AC.105/802, para. 22.
[24] Law of the Russian Federation on Space Activity, August 20, 1993, available at <http://www.jaxa.jp/jda/library/space-law/chapter_4/4-1-2-7/4-1-2-71_e.html>.
[25] *Id.*, para. 24.

3.1.3. Promotion of International Cooperation

International space legislation provides a forum for international cooperation on space activities. The Resolution has been issued concerning international space cooperation.[26] Bilateral or multilateral cooperation has been one of the most important characteristics of space exploration in recent years. The Project of the International Space Station is one excellent example. International space cooperation shall provide a forum for the States to inter-complement each other; furthermore, it will be helpful to realize the aims of peaceful use of outer space and maximization of the profits from the utilization of outer space.

Space cooperation appears all the more meaningful to and among developing countries when western countries set barriers to prohibit the export of high-tech products. National space legislators for those developing countries should thus be more mindful of the importance of international space cooperation and try to formulate an efficient, feasible and operationable legal framework for space cooperation. Without a doubt, this principle should similarly apply to national space legislation in developed countries.

Outer Space, with the non-existence of national sovereignty, can never be monopolized by any State. Space cooperation is beneficial to both developing and developed countries. For example, assistance in the rescue of astronauts as defined in the Rescue Convention clearly demonstrates that even States without space-faring ability can assist in the space activities.[27] National space legislation should not only define international cooperation in principle, but more important provide a detailed structure to put space cooperation into practice.

3.1.4. Maintaining Flexibility and Constant Evolvement

Since the first satellite launch in 1957, space activities have developed rapidly in both variety and formality. With further technological and economic development, we can expect more activities to arise together with new legal problems. In view of the new space activities, national legislation should have the courage to group together space lawyers and come out with new legislation to fill in those new areas. On one hand, national legislation should specifically target the new activities that have arisen; on the other hand, the legislation should be flexible enough to accommodate more new activities that are to arise in the near future.

The balance between stability and flexibility is a new task to space legislators. However, this problem also exists in other high-tech areas. For example, the emergence of the Internet calls for rules to regulate online activities. Some scholars have argued that it is not sensible to formulate new laws just because of new technology.[28] Existing laws should continue to regulate new activities subject to appropriate interpretation or modification to certain provisions. This is also instructive to national space legislators.

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[26] Declaration on International Cooperation on Exploring and Utilizing Outer Space for the Benefits and Interests of All Countries, Especially in Consideration of Developing Countries' Demands, adopted by the 51st United Nations General Assembly in 1996. UNGA Res. 51/122, of December 13, 1996.

[27] Space-faring ability is not the condition for a State to become Contracting Party to the Rescue Agreement.

[28] A.L. Shapiro, The Disappearance of Cyberspace and the Risk of Code, 8 *Seton Hall Constitutional Law Journal* 703 (1998).

3.1.5. Gradual Process with Order of Priority

Legislation for space activities remains to be a new task for most national legislators. A period of familiarization with outer space and space legal system is indispensable for those legislators to carry out their legislative task. Outer space has become an area of strategic importance to the States. National space legislators need to be wary of the potential implication of space legislation to national security and interests. The legislation should be carried out step by step. For this purpose, the order of priority for legislation is to be identified. As discussed above, commercialization of outer space and for the purpose of continued application of existing space treaties, national legislation on licensing should be put in the first place.[29] Other areas for consideration include registration of space objects, state responsibility and liability (indemnification system), and financing system (including space insurance system) for space activities.

3.2. Means

National space legislation is a complicated process. During the long march of legislation, we need to take into account of the following factors. First, to better reflect the national needs and protect national interests, it is necessary to carry out a policy and legal assessment of the draft legislation.

Second, commercialization of outer space is coupled with the process of privatization. Private entities are participating in the space exploration and play an important role to the ongoing and future space commercialization.[30] Such a process has substantially changed the previous space regime. Thus, key stakeholders in space activities should be encouraged to participate in national space legislation. Opportunities should be provided for their participation. Consultation should also be made prior to space legislation and the submission of such proposals. Presently, self-regulation has been highly advocated for high-tech areas.[31] We should not disregard its application in space legislation.

Third, customary law is an indispensable part of the laws regulating space activities.[32] We should not ignore its strong influence on space legislation. By establishing evidence of state practice, developing countries can make use of customary law to protect their own interests. For example, developing countries with a sensing capability can influence the development of law by taking action to establish state practice that would enhance and protect the right to access to data from all sensing States.[33]

On one hand, we can put customs down in written documents to guide space activities; on the other hand, consistent space practice promotes and confirms the customs. In this way, our concerns over legal vacuum in certain space activities can be mitigated to a certain extent.

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[29] P.P.C. Haanappel, *The Law and Policy of Air Space and Outer Space: A Comparative Approach* 10 (Kluwer Law International, 2003).

[30] Mark J. Sundahl, Unidentified Orbital Debris: The Case for a Market-Share Liability Regime, 24 *Hastings International & Comparative Law Review* 125 (Fall 2000).

[31] J.I. Edelstein, Anonymity and International Law Enforcement in Cyberspace, 7 *Fordham Intellectual Property Media & Entertainment Law Journal* 284-286 (1996).

[32] I. H. Ph. Diederiks-Verschoor, *An Introduction to Space Law*, 2nd Edition, 10-12 (Kluwer Law International, 1999).

[33] United Nations General Assembly, Committee on the Peaceful Uses of Outer Space: Report on the United Nations/Nigeria Workshop on Space Law on the theme "Meeting International Obligations and Addressing Domestic Needs", Abuja, November 21-24, 2005, A/AC.105/866, para. 33.

Fourth, legislation is an important state activity; space legislation should of course follow normal procedures. We should at this point emphasize the existing skills and experiences gained thus far and apply them in space legislation. Legislation is one way to publicize space law; we should also use other ways, including workshops, special courses, conferences and seminars to disseminate expertise on space law. Through these ways, we could cultivate a good environment for national cognition of space law and potential space legislators can be trained to have a better understanding of space law.

4. China's National Space Legislation: Present and Future

China has always placed high emphasis on space activities and space regulation. Due to historical reasons, China has so far concentrated on technological development in outer space; development and research of space law has been far lagging behind. China has on various occasions acknowledged the importance of space law in the development of space exploration and taken efforts to step up in this area. Currently, there are no national space laws in China. But several regulations have been passed concerning registration and launching of space objects. Several items of legislations are being actively pursued in the National People's Congress to regulate the state's space research and activities.

4.1. Space Policy

The aims of China's space activities are: to explore outer space, and learn more about the cosmos and the Earth; to utilize outer space for peaceful purposes, promote mankind's civilization and social progress, and benefit the mankind as a whole; to meet the growing demands of economic construction, national security, science and technology development and social progress, protect China's national interests and build up the comprehensive national strength.[34]

As further stated in the White Paper on China's Space Activities, China carries out its space activities in accordance with the following principles: adhering to the principle of long-term, stable and sustainable development and catering the development of space activities to and serving the State's comprehensive development strategy; upholding the principle of independence, self-reliance and self-renovation and actively promoting international exchanges and cooperation; selecting a limited number of targets and making breakthroughs in key areas according to the national situation and strength; enhancing the social and economic returns of space activities and paying attention to the motivation of technological progress; sticking to integrated planning, combination of long-term development and short-term development, combination of spacecraft and ground equipment, and coordinated development.[35]

Taking into account China's situation, the above aims and principles apply generally to national space legislation in China. It is also to be noted that international cooperation is elaborated in a separate part in the White Paper, implying that China attaches great importance to space cooperation in various levels.[36]

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[34] The State Council Information Office, China's Space Activities (White Paper), November 2000, Beijing, China, available at <http://www.spaceref.com/china/china.white.paper.nov.22.2000.html> (last visited August 9, 2006).
[35] *Id.*
[36] *Id.* Guiding principles for international cooperation are: the aim of international space cooperation is to peacefully develop and use space resources for the benefit of all mankind; international space cooperation should be carried out on the basis of equality and mutual benefit, mutual complementarity and common development, and the

4.2. Legal Framework for Space Activities

China launched its first satellite (DHF-I) by Long March vehicle in 1970 and became full member of the UNCOPUOS ten years later. The membership has accelerated China's pace in space legislation. The Chinese government ratified the Outer Space Treaty in 1983 and the other three space treaties (except the Moon Agreement) in 1988 respectively.[37]

Efforts in national space legislation started around 1994; but most substantial work was carried out after 1998 when China reformed its administrative system for the industries. China National Space Administration (CNSA) was then the most important authority responsible for preparing space legislation, formulating policies for space industry and technology, making plans for space development and setting standards in this area.[38] So far two space regulations have been adopted: the Provisions and Procedures for the Registration of Space Objects on February 8, 2001; and the Interim Measures on the Administration of Permits for Civil Space Launch Projects on November 21, 2002.

4.2.1. Registration of Space Objects

The Provisions and Procedures for the Registration of Space Objects, published in 2001 by the Commission of Science, Technology and Industry for National Defense (COSTIND) and the Ministry of Foreign Affairs (MFA), is the first domestic administrative regulations in China on space activities. The main purpose of this regulation is to fulfill China's commitments under the Registration Convention, while taking into account the practical situation in China.

All the space objects launched within the territory of China, or launched abroad but with China as a co-launching State, shall be registered with the COSTIND within 60 days after the space objects were launched into orbit. The COSTIND should maintain the National Registration Booklet. Modification to the registration shall be done within 60 days after the change of the circumstances such as changes in orbit, disintegration, end of operation, return or re-entry into atmosphere. The COSTIND shall provide to the MFA relevant registration data within 60 days after domestic registration; the MFA will then register with the United Nations Secretary-General. With regard to the special case of Hong Kong and Macao, a special Sub-Registration Booklet shall be established with the registration procedure to be stipulated separately.[39]

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generally accepted principles of international law; the priority aim of international space cooperation is to simultaneously increase the capability of space development of all countries, particularly the developing countries, and enable all countries to enjoy the benefits of space technology; necessary measures should be adopted to protect the space environment and space resources in the course of international space cooperation; the function of the United Nations Office of Outer Space Affairs (OOSA) should be consolidated and the outer space application programs of the United Nations should be backed up.

[37] China acceded the Outer Space Treaty on December 30, 1983; the Rescue Agreement on December 14, 1988; the Liability Convention on December 12, 1988; the Registration Convention on December 12, 1988.

[38] China National Space Administration, <http://www.cnsa.gov.cn> (last visited June 20, 2006).

[39] As identified by Xiaohong Liu & Xiaoqing Wang in the paper The First Administrative Regulation on Space Activities in China presented at the United Nations/International Institute of Air and Space law (IIASL) Workshop on Capacity Building in Space Law during November 18-21, 2002 in the Hague, the registration procedure include open end; possibility of being amended after certain period of implementation; and possibility of being upgraded into administrative law or regulation in the future.

4.2.2. Space licensing

The Interim Measures on the Administration of Permits for Civil Space Launch Projects, released by the COSTIND in 2002, established the licensing regime for all spacecraft launches within the territory of China, excluding launches for military purposes and the entry of such spacecrafts over which the natural persons, legal persons or other organization of China have had property or have property by means of on-orbit delivery into the outer space from outside of the territory of China.[40] The COSTIND is the authority responsible for examining, approving and supervising all civil space launch projects.[41]

The general project contractor should apply to the COSTIND with relevant documents 9 months before the prearranged month for the launch of the project.[42] The COSTIND should organize the examination of the project within 30 days as of receipt of the application documents and notify in writing the applicant and the relevant departments of the decisions.[43] The permit should include the following contents: the applicant and its legal representative, the registration address of the applicant's domicile, main contents of the project, the prearranged time for launch, validity period of the permit, the organ issuing the permit and the time of issuance.[44] An application for modification or cancellation should be filed 90 days before the expiry of the validity period of the permit.[45]

The permit holder must purchase the third party liability insurance and other relevant insurances for launching a space object.[46] For a project in the stage of a domestic executive launching site, the permit holder shall report the launching plan 6 months before the prearranged month for launch and file an application for approval to leave the factory with relevant materials before entering the stage of a launching site.[47]

The Interim Measures have further provided administrative penalties and criminal liabilities for acts such as concealing the truth, practicing frauds or damaging the benefits of the state, undertaking projects unauthorizedly, neglecting duties or abusing powers with losses caused to the state.[48]

4.2.3. Miscellaneous

For a complete understanding of space legislation in China at the present stage, we may also need to note some regulations on space activities for military use.[49] The Regulations on Control of Military Products Export, first released in 1997 and revised in 2002, were instituted to strengthen unified management over military products export and protect the normal order of

[40] Interim Measures, Article 2.
[41] *Id.*, Art. 4.
[42] *Id.*, Art. 5-6.
[43] *Id.*, Art. 7.
[44] *Id.*, Art. 10.
[45] *Id.*, Art. 13-14.
[46] *Id.*, Art. 19.
[47] *Id.*, Art. 20.
[48] *Id.*, Art. 24-26.
[49] Space Law: China's Regulations, World Security Institute, China-US Dialogue on Space, available at <http://www.wsichina.org/subprogram.cfm?subprogramid=2&charid=1#00008> (last visited June 20, 2006).

military products export.[50] Several principles shall be followed for the export of military products: being useful to the self-defense capability of the recipient country; being not harmful to the peace, security and stability of the relevant region of the world; staying hands off the recipient country's internal affairs.[51] As required by the above Regulation, the COSTIND and the People's Liberalization Army (PLA) General Armament Department (GAD) furthered drafted the Military Products Export Control List in 2003.[52] The list includes launch vehicles, missile weapon systems and military satellites.[53]

To further strengthen export control system and prevent the proliferation of missiles and other delivering systems that can be used to deliver weapons of mass destruction,[54] the State Council published the Regulations of the People's Republic of China on Export Control of Missiles and Missile-related Items and Technologies in 2002, together with the Missiles and Missile-related Items and Technologies Export Control List. According to the regulation, items including rockets, unmanned air vehicles, missiles (ballistic and cruise missiles) and missile-related items and technologies are subject to export control.[55]

A licensing regime is established for the export of the above items and technologies. The exporter should apply to the competent foreign economic and trade department of the State Council with the export application form and relevant documents. The above department shall examine the application (possibly joined by other relevant departments of the State Council and of the Central Military Commission) and make a decision within 45 days after the receipt of the application.[56] The regulation has further provided possible administrative penalties and criminal liability for certain acts.[57]

4.3. Further Developments

Space legislation is at the moment among the highest priorities on the CNSA's agenda. A special task force was set up under the CNSA to study the issue of national space legislation. It has been agreed that space legislation in China should move gradually. A comprehensive national law on outer space shall not be pursued at the present stage as the conditions for such a law is still premature. The administrative structure, mode of action and code of conduct concerning space activities in China are still in the process of improvement; rules and regulations on specific aspects of space activities shall be the priority of space legislation. Such specific regulations may touch on such issues as investment and financing, insurance and indemnification system, commercial operation and management, and international cooperation and coordination. Once the regulations prove to be efficient and practicable, a comprehensive law on outer space may be easily drafted and adopted. The ultimate goal for China is of course to have a national space law, complemented by a set of administrative laws/regulations and departmental rules.

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[50] Regulations on Control of Military Products Export, Art. 1.
[51] *Id.*, Art. 5.
[52] *Id.*, Art. 2(2) provides that the military products export control list shall be formulated, adjusted, and promulgated by the state department in charge of military products export.
[53] The Military Products Export Control List.
[54] Regulations on Export Control of Missiles and Missile-related Items and Technologies, Art. 3.
[55] *Id.*, Art. 2.
[56] *Id.*, Art. 10.
[57] *Id.*, Art. 15-22.

With this consensus in mind, China has draft legislation on liability issue under discussion.[58] This new draft legislation intends to concretize and implement the 1972 Liability Convention. The efforts above has sufficiently demonstrated Chinese Government's firm efforts in carrying out international obligations on space issues and commitment to achieving legal transparency in outer space.

5. Conclusion

National space legislation has never been so important as at the present stage. The understanding based on the concept of non-sovereignty of outer space and the fact that the States are the sole actor in space activities have been so prevalent that many firmly believe that international space legislation is the only effective means to regulate space activities.

With space activities undergoing drastic changes and the process of commercialization in outer space ongoing, the existing space law at the international level cannot adequately deal with all the new issues. The participation of private entities in space activities calls for national space regime to take the lead in providing a legal framework to fill in the legal vacuum. The international society has acknowledged the need and urgency of national space legislation; it is time to consider the reaction from the States. This paper intends to offer a useful guide to the States on national space legislation. The aims, objectives and principles to be followed in national space legislation are deeply discussed in the paper. China's practice in space legislation further exemplifies the discussions above.

In conclusion, commercialization and privatization of outer space have justified the necessity and urgency of national space legislation. When making national legislation for outer space affairs, the States, especially the developing countries, need to be wary of the strategic importance of national legislation in balancing their international commitments and national interests. Such national space legislation should further promote the healthy development of space activities at the international level as well as at the national level.

[58] The Provisional Regulation on Liability for Damage Caused by Space Objects has been placed on the agenda.

COMMERCIAL SPACE LAUNCHES

by

Paul B. Larsen*

INTRODUCTION

This paper describes the legal basis for private civilian commercial activities in space. At the beginning of the space age (1957 Sputnik launch) many states assumed that only governments would engage in outer space activities. At that time, most space laws were based on that assumption. Some states, including the United States, managed to persuade the parties to the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, the first space treaty,[1] to leave open the possibility of private enterprise in outer space. In the subsequent decades private enterprise flourished. Because most commercial development happened after the basic space law treaties had been established, the private commercial space enterprises[2] were forced to fit their activities into a legal regime principally created for governments.

Access to outer space is the private entrepreneurs' first requirement. Access is regulated by international law. The most important legal regime for outer space is the multilateral 1967 Outer Space Treaty. Other relevant multilateral treaties include the treaties on registration of space objects, return of space objects, and the international liability regime for damage caused by space objects. Commercial users are also subject to a number of United Nations General Assembly resolutions.[3]

Furthermore, multilateral treaty law governs use of radiofrequencies necessary to control satellites in outer space.[4] Application of international laws governing military uses of outer space are also relevant because military activities can interfere with commercial activities in outer space. War in outer space has the potential for stopping commercial outer space activities. Moreover, military and private civilian activities compete for orbital slots, radio frequencies, and launch facilities. Additionally, many bilateral agreements regulate commercial uses of outer space for example the United States has bilateral agreements with Japan and Canada regarding communication satellites.

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1 610 U.N.T,S. 205 (hereinafter the Outer Space Treaty).

2 In the following discussion "private" commercial space activities are differentiated from governmental commercial activities.

3 Outer Space Treaty, *supra* n. 1; Agreement on Rescue of Astronauts, the Return of Astronauts and the Return of Objects, Launched into Outer Space, 672 UNTS 1119 (hereinafter Rescue Convention); Convention on International Liability for Damage Cased by Space Objects, 961 UNTS 15 (hereinafter Liability Convention); Agreement on Registration of Objects Launched into Outer Space 1923 UNTS 15. (hereinafter the Registration Convention); Agreement Governing activities of States on the Moon and Other Celestial Bodies, 1363 UNTA 21 (hereinafter the Moon Agreement); Five UNGA Resolutions on Outer Space have been adopted by the United Nationals General Assembly.

4 International Telecommunication Union (ITU) regulates the use of radiofrequencies. The ITU legal instruments are the Constitution, Convention and Radioregulations, see Project 2001, Legal Framework for the Commercial Use of Outer Space (Satellite Communications).

The age of new space law treaties may be coming to a close because no new space law treaties have been adopted since 1979. Since that year, many new legal issues have arisen, for example private launches of human beings into outer space. Many of the new legal issues can best be regulated by national legislation. In view of the stalemate in the U.N. Committee for Peaceful Uses of Outer Space (COPUOS) regarding development of new space laws, COPUOS has begun to arrange workshops to educate individual countries encouraging adoption of national space legislation. Private commercial access to and uses of outer space are regulated extensively by national laws and regulations. These laws implement the multilateral and bilateral international laws and impose national regulations that are not inconsistent with international laws. National space laws range from launch permits, debris regulation, assignment of radio frequencies to national security restrictions. Arguably, domestic legislation can regulate more intensively and extensively than can the existing space law treaties. Private commercial users of outer space enter into many private contracts regarding, for example, launch of space objects, financial interests in secured assets, construction of space objects, and resolutions of disputes. Thus these commercial operators are regulated by private laws as well as by public laws. Countries that do not have national legislation are beginning to feel that those countries that have national legislation exert too much influence over the launch services market in countries without national legislation. These countries are therefore motivated to adopt national legislation.[5]

A. Private Commercial Operators' Access to Outer Space

"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 in accordance with international law." This provision in Art. 1 of the 1967 Outer Space Treaty allows States free access to outer space, subject to existing international law. The Outer Space Treaty Art. II lays down the fundamental rule of law that outer space is free of sovereignty claims. That does not mean that outer space is without laws. It is territory that belongs to everyone; it *is terra communis*.[6] Thus, the Outer Space Treaty guarantees free access to outer space but subject to the right of access of all users. One country may not prevent access to outer space by other countries because that would indicate national appropriation by claim of sovereignty, which is precluded by the Outer Space Treaty Art. II.

The Outer Space Treaty is not only a treaty among the states parties; most states are parties thus giving the treaty additional authority as customary international law. Rights and obligations under the treaty are conferred on states, which in turn may permit private users right of access to outer space. States may either confer rights of access to individual commercial launch operators on a case-by-case basis, or on a more general basis through national implementing legislation. For example Australia, U.K.. and the United States have adopted legislation conferring rights of access to qualified private commercial launch operators. India and many other countries have not yet adopted national legislation, but issue access permits based directly on India's treaty rights. Whether states adopt implementing legislation usually is usually related to the volume of private space commerce. States obtain more effective and uniform oversight of space launches by adoption of national legislation. States that do not adopt national

[5] Zhao, Liberalization of Launch Services within a Plurilateral Regime with reference to China's Commercial Launch Services, at 1-49, Bangalore Space Law Conference 2005.

[6] It is common territory to which sovereignty cannot be acquired; see Jessup and Taubenfeld, Controls for Outer Space and the Antarctic Analogy, at 181.

legislation may be surprised to experience that its nationals have engaged in unreasonably risky activities and have thus subjected their national state to unexpected liability exposure for damages caused by failed launches or other mishaps in outer space.

It is important for private commercial operators to know where space law applies. Specifically, at which altitude do the rights and obligations of the Outer Space Treaty begin to govern space objects? The Chicago Convention Art. 1 provides that air space is sovereign[7] and thus the national laws of a state apply to all activities in air space over individual states. The Chicago Convention does not establish an upper limit on sovereign air space. However, the Outer Space Treaty by its terms [8] applies to objects placed "in orbit around the Earth." The minimum altitude for orbital flight is about 100 kilometers above the surface of the Earth.[9]

What are the obligations of party states to supervise private commercial space activities? The Outer Space Treaty Art. VI provides: "States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the Moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty."[10] States Parties to the treaty can therefore be held legally responsible for and should, in their own self interest, supervise all activities of their private commercial operators in outer space for which they are responsible under the Treaty. The obligation to supervise private commercial activities is spelled out in the Outer Space Treaty, Art VI, stating 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." The Treaty does not define which is the "appropriate" state. The history of the word "appropriate" may be found in the 1963 United Nations General Assembly Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of outer Space[11] which preceded the Outer Space Treaty. It states: "The activities of non-governmental entities in outer space shall require authorization and continuing supervision by the State concerned." Which is the "State concerned" remains ambiguous. Importantly, the drafters intended only one state to authorize private space activities. The drafters of the Treaty, who wanted to assure that at least one state would supervise private launches, went to the extreme and made it possible for several states to be considered the one state responsible for authorization and supervision.

Relevant to identification of the "appropriate" state is the Outer Space Treaty Art. VII which makes the state which launches or procures the launching liable for damages to other states. The implication is that the launching state is the "appropriate" state to authorize and continue supervision of private commercial space activities. The launching state has immediate control over the launch and over the entry into outer space and over what happens if the launch is not successful. The launching state is best able to oversee all safety aspects of a private launch.[12]

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[7] Convention on International Civil Aviation (the Chicago Convention) 15 UNTS 295.

[8] Outer Space Treaty, *supra* n. 1, Art. IV.

[9] Note that the Administrator of the U.S. Federal Aviation Administration in 2004 issued astronauts wings to the pilot of Space Ship One who barely exceeded the 100 km altitude. She thus recognized that the pilot had entered outer space. Also note Australian law recognizing a 100 km. delimitation of outer space.

[10] Outer Space Treaty, *supra* n. 1, Art VI.

[11] United Nations General Assembly Resolution 1962 (XVIII).

[12] But note ambiguity about who is the launching state because of the wide definition of launching state in the Registration Convention, Art. 1, *supra* n. 3.

Also relevant is the Outer Space Treaty, Art. VIII, which provides: "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 personnel thereof, while in outer space or on a celestial body." The launch itself is the most dangerous part of bringing a space object into orbit. However, the obligation to register the space object does not occur until after the launch has taken place.[13] The Registration Convention, Art II,[14] explains that when more than one state can claim that they are the state of registry, then the state parties shall jointly decide which one of them shall register. The purpose is to decide which of them has jurisdiction and control over the satellite pursuant to the Outer Space Treaty, Art VIII. Many legal consequences flow from a state's jurisdiction and control, for example property rights. Therefore, only one state can have jurisdiction and control over space objects.

While the Outer Space Treaty, Art. VI, implicitly refers to only one state as being "the appropriate State Party" to authorize and supervise the entry of private commercial parties to outer space, ambiguity is created by the Registration Convention's [15] subsequent very broad definition of launching state as including states which launch or procure a launch and states from whose territory or facility a launch takes place. Four different states may all qualify as the launching state. That places active launching states, such as France, Russia, China, the United States and India in the uncomfortable situation of possibly being responsible for overlapping oversight over launches. Literally, a launch of a space object procured by a Canadian company, launched in China or launched by SeaLaunch on the high seas, would be subject to authorization and continuing oversight by several countries. [16] From a logical point of view, because the Registration Convention provides that the launching State shall register the space object and that is the state most likely to know the location of the satellite, having put it in orbit, the launching state, the state of registration, and the appropriate state, should be one and the same.[17]

Operators seek to come under the jurisdiction of the "appropriate" state because commercial launch operators may benefit from being subject to "authorization and continuing supervision" by a state. The benefits of various national laws vary and the launch operators will seek to bring the launch within the jurisdiction of the state with the most favorable legislation. The United States legislation enables a launch operator to limit liability by placing a ceiling on potential liability for a failed launch. One important launch operator, SeaLaunch, which launches from the high seas, reorganized the company in order to entitle the company to the benefit of limited liability exposure under U.S. legislation.[18]

The Outer Space Treaty Art.VI requires states parties not only to authorize and supervise the private launch into outer space but also to continue supervision of satellites after the launch. This includes continued supervision of privately launched satellites in outer space

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[13] *Id.* The Registration Convention, Art. II, provides that a State shall register a space object "When a space object is launched into Earth orbit or beyond."

[14] *Id.* Art. II.

[15] *Id.* Art. I.

[16] Note the more limited definition of launching state in the United Nations General Assembly NPS Resolution, 47th Session, Supp. No. 20 (A/47/20).

[17] See discussion below at footnote 21 regarding changes of ownership.

[18] Note that liability is unlimited under the Liability Convention, but that an individual state can place a ceiling on an operator's liability by national legislation; however, the state assumes the liability exposure above the stated ceiling. See further discussion of liability ceiling at footnote 38 below.

after launch. The obligation to supervise includes the de-orbit from outer space. Also Art.VI specifically requires states to supervise activities of their spacecraft while landing and departing from the Moon and other celestial bodies.

Included within their responsibility under international space law is their states' responsibility for their space debris.[19] States have launched many satellites since the space age began in 1957. Many space objects have fragmented into pieces, some of them so small they cannot be tracked. Continuing oversight responsibility is difficult if states do not know where the debris exists. After de-orbit, debris responsibility is complex if the space object has fragmented and it can no longer be identified as belonging to any one state. Defensively, states are actively adopting national satellite construction regulations and launch procedures in order to minimize debris formation.[20]

Changes in ownership of space assets cause oversight problems. Privately owned satellites are now often transferred to owners located in a different state than the launching state. For example a company called New Skies was formed in the Netherlands. It received ownership of several satellites formerly owned by INTELSAT. The Netherlands refused to register these satellites because of the possible liability and oversight implications of registration.[21] Therefore, the original launching states continue their registrations and oversight responsibilities even though the original launching state is no longer the appropriate state to supervise these satellites. The drafters of the existing space law treaties did not foresee changes in private ownership of satellites. Ideally the "appropriate" state should be the state with the best connections to the private operator to exercise direct jurisdiction over it in order "to require authorization and continuing supervision" of its activities.[22] The space law treaties need amendment that provides for ownership changes. Another way to resolve such new ownership problems is through bilateral agreements in which states agree to assume the Outer Space, Article VI, responsibilities of the "appropriate" state. [23]

B. The Commercial Launch Business

Currently the greatest barrier to outer space commerce is the high cost of launching It presently costs $10,000 to $20,000 per kilogram to launch objects into outer space. The cost varies depending on whether the owner of the space object employs a U.S. launch operator, a French operator, or a Russian of Chinese launch operator. It is difficult to quantify the exact cost because states have different mixes of direct and indirect subsidies to launch operators.[24] The real cost of private commercial space launches is also distorted because launch operators tend to benefit from the technological advances in launch technology developed for military launches. The big space launch operators like Boeing and Lockheed Martin and Orbital Sciences Corporation have had difficulty competing with low cost launch competition from Ukraine,

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[19] Note that the Liability Convention, Art 1, includes component parts and the launch vehicle within the definition of "space object."

[20] See Mirmina, Reducing the Proliferation of Orbital Debris: Alternatives to a Legally Binding Instrument, 99 Am. J. Int'l L. 649.

[21] See Dutch note verbale, UN Doc. A/AC.105/824, 16 March, 2004.

[22] Outer Space Treaty, *supra* n. 1, at Art VI.

[23] Lee, The Australian Legal & Regulatory Framework for Space Launches, Guide for the Space Industry, at 28 – 33.

[24] See Transpace, Determination under Sec. 301 of the Trade Act of 1974, 50 Federal Register 29631, July 22, 1985.

Russia and China. One consequence of the competition has been for the large United States launch operators to consolidate with the low cost launch operators in order to take greater advantage of cheap Russian and Chinese launches and also to enjoy greater economies of large scale. Thus Lockheed joined a Russian launch operator to form International Launch Services (ISL) using Russian Proton rockets. Boeing joined companies from several nations to form SeaLaunch which launches from the high seas, but under United States authority and supervision. Furthermore, two large U.S. companies, Lockheed and Boeing, are planning to merge their governmental launch business in order to reduce cost of maintaining two separate governmental launch services. This merger should be viewed in the context of the need of the US Government to have a reliable commercial launch service to launch its own satellites. It corresponds to the European Space Agency's preferential use of the European launch service, i.e. Arianespace.[25] While these consolidations raise antitrust legal questions, they also raise important national security questions. States need to have a domestic launch capability for reasons of national security.

Another consequence of competition among launch operators is the recent formation of companies seeking to use simpler technologies than used by the large companies in order to bring the cost of launch from about 20,000 per kilogram down to about $2000 per kilogram. The 2004 Ansari X-prize competition boosted hopes for cheap launches into outer space. Winner of the Ansari-X prize competition, Mr. Bert Rutan (financed by Microsoft co-founder Paul Allen) managed to build a privately-developed reusable suborbital vehicle which carried two people above 100 km altitude twice within two weeks. After that feat, Sir Richard Branson formed the Virgin Galactic Company which will use Bert Rutan's technology to build several reusable space vehicles (RLVs) for carriage of passengers. The price per passenger will be about $200,000. Another space launch entrepreneur, Mr. Elon Musk, is developing simple cheap launch vehicles that will charge only one fourth of the price demanded by established launch operators, to place a payload of approximately 1000 pounds into low orbit of about 300 miles altitude.[26] However, the space launch business is very risky as proved by the failure of Elon Musk's first launch attempt.[27]

NATIONAL IMPLEMENTATION OF INTERNATIONAL SPACE LAW

U.S. national regulation actively promotes private space commerce.[28] Active governmental authorization and supervision of private activities in outer space were triggered by potential private operators' claims that they could not engage in private space business activities except by having a liability ceiling established by national legislation, made applicable through individual licensing of operators. The Liability Convention provides for unlimited liability for damages caused; therefore the private operators were of the view that the Convention's burden of unlimited liability would either crush them or prevent them from starting up, unless the 'appropriate' states placed a ceiling on their catastrophic risk exposure. Many of the potential private operators are small companies that do not have sufficient assets to pay damages absent a limit on liability. Without a liability limitation, the space business would be deprived of their

[25] Lee, *supra* n. 23, at 23.

[26] Wayne, A Bold Plan to Go Where Men Have Gone Before, New York Times, Feb. 5, 2006 at 22.

[27] However, Musk plans to launch another space vehicle; see Dornheim, First 30 Sec. Good, Aviation Week & Space Technology, April 3, 2006.

[28] 49 U.S.C. 70103.

initiative, their ingenuity and in particular their inventiveness towards bringing the cost of launch down. However, it can be argued that national assistance for resolving risk exposure is a subsidy to the enterprise, thus further distorting the true price of a launch into outer space.

The following will describe some of the most significant national regulations of commercial uses of outer space. Discussed will be how states parties to the Outer Space Treaty have either adopted national legislation in conjunction with the outer space treaties, or depend directly on the treaties without further national legislation. One state's national regulation may overlap with the regulation of other states. Therefore, issues relating to removal and elimination of overlapping regulation will be discussed.

A. U.S. National Regulation of Private Commercial Launches and of Re-entry

1. General Commercial Launch and Reentry

The U.S. Department of Transportation (DOT) has authorized more then 100 private commercial launches. The U.S. Commercial Space Launch Act [29] authorizes the Secretary of Transportation not only to regulate commercial launches and reentries, but also to promote the commercial launch industry. Safety regulation and promotion of the launch industry could place the Secretary in the uncomfortable situation having of to choose between safety and promotion. Analogously, the Secretary was until recently placed in a similar dilemma with regard to air commerce because the U.S. Federal Aviation Act gave him a similar mandate to regulate safety and also to promote the aviation industry. The U.S. Congress finally decided that aircraft flight would be safer if the Secretary concentrated on air safety. The Congress eliminated the legislative promotion mandate for aviation. The Secretary's dilemma in the space launch industry has not yet risen to congressional attention.

The Secretary's statutory functions under the Commercial Space Launch Act have been delegated to the Federal Aviation Administration (FAA), which is the largest Administration within DOT. The FAA has extensive resources and expertise regarding aviation safety, much of which can be used to back up safety regulation of space vehicles. The Commercial Space Launch Office is administered by the Associate Administrator in charge of the Office of Commercial Space Transportation.[30] It is this office that administers the commercial space launch laws and regulations adopted pursuant to the Act. The FAA only licenses private commercial launches. It has no legal authority to authorize U.S. government launches. The U.S. National Aeronautics and Space Administration (NASA) promotes a number of private continuing activities in outer space. For example NASA awarded $500 million to two companies to develop private spacecraft to replace the space shuttle when it is retired in the year 2010. The private spacecraft are intended to provide transportation to the International Space Station within NASA's legislative authority and oversight.[31]

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[29] 49 U.S.C. 70101 et seq., For an excellent explanation of the Commercial Space Launch Act, see Hughes and Rosenberg Space Travel Law (and Politics): The Evolution of the Commercial Space Launch Amendments Act of 2004, 31 J. Space L.117.

[30] See http://ast.faa.gov for further details.

[31] Berger, NASA places $500 million bet on two very different firms, Space News, Aug. 28, 2006 at 6.

The US Commercial Space Launch Act requires private operators to obtain a license in order to launch in the United States and to operate a launch site in the United States. A permit is also required for reentry of space objects A U.S. citizen must obtain launch licenses for a launch outside of the United States, unless a foreign government having jurisdiction over the launch agrees to authorize and supervise the launch. For a launch license to be issued, the payload must comply with U.S. requirements.[32]

The FAA may transfer a license to another person, after the FAA has ascertained that the transferee will comply with the laws and regulations of the Commercial Space Launch Act. The FAA prescribes safety regulations for launch vehicles, reentry vehicles, and for persons involved in launch and reentry. In order to ensure compliance with laws and regulations the FAA is permitted (not required) to have a Federal employee observe the launch and the operator must coordinate the launch with that FAA representative. [33]

The FAA may modify a launch license and the operator must comply with any such modification of the license. The FAA may also suspend the license if the operator fails to conform to the license as issued. The FAA may revoke the license for reasons of public health, safety, national security or foreign relations. Revocation and modifications of the license takes effect immediately, unless differently stated.[34]

In addition to a license to launch, the FAA also has statutory authority to approve the safety of launch and reentry vehicles, their safety systems, processes and services and of persons employed in launch activities.[35] Safety approval is voluntary for the operator, but safety approval will facilitate FAA issuance of the launch license, which is a powerful incentive. Separate FAA safety approval is persuasive in convincing customers that the launch vehicle is safe and dependable. FAA safety approval is also of value in the launch operator's negotiations for use of government launch ranges because the FAA will coordinate the safety approval with the safety officials attached to government owned launch ranges. For the safety approval the FAA examines activities that may endanger public health and safety including review of the license applicant's safety organization, the design of the launch vehicle, and its operation. Much of the safety examination is of the kind that a launch range would require anyway.

Procedurally, the FAA Commercial Space Launch Office has established five steps towards issuance of a license for launch into outer space, including possible reentry of a reusable launch vehicle:[36] (1) The FAA first consults with the applicant in order to guide the applicant's preparation of the license application. (2) The FAA reviews government policy to ascertain whether the application will affect U.S. national interests (national security, public health, and safety). (3) The FAA reviews the applicant's capability of launching from the designated launch facility, including reentering at designated reentry point. Here the FAA reviews the applicant's organizational safety plan, estimates the risk of the mission, examines safety process, mission readiness, the rules, plans and checklists for the mission, and studies the

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[32] 49 USC 70104.

[33] 49 U,S,C, 70106.

[34] 49 U.S.C. 70107.

[35] 49 U.S.C. 70105; see FAA Notice of Proposed Rulemaking 70 Federal Register 31192, June 1, 2005.

[36] 14 Code of Federal Regulations 431. See excellent description of U.S. Government space launch regulations in Hughes and Rosenberg, *supra* n. 29 at 25.

plans for communication, operations and accident investigation, and emergencies. (4) The FAA examines whether launch of the payload and its reentry will cause any special safety or policy problems. (5) The FAA reviews the environmental consequences in accordance with the National Environmental Policy Act (NEPA).[37]

The potential liability of the U.S. Government for private commercial activities is a key factor in licensing. Launch operators want to limit their liability. The Government also wants to control its liability and to keep the risk as low as possible. The Commercial Space Launch Act regulates liability as follows.[38] In order to obtain a launch license: (1) the operator is required to obtain third party liability launch insurance of $500 million. or as much liability insurance as is available at reasonable cost,[39] (2) The operator must obtain liability launch insurance of $100 million, or as much insurance as is available at reasonable cost on the insurance market, in order to cover the operator's possible liability to the government. The amount of available insurance has, so far, always been less than the statutory liability limits.[40] The amount of the insurance policy thus becomes the operator's *de facto* liability limit. (3) The operator must also agree to enter into a reciprocal waiver of claims with its contractor, subcontractors, owners of payloads and the contractors and subcontractors of the owners of the payload. In this crosswaiver the parties agree to assume responsibility for property damage or loss as well as personal injury or death of employees resulting from the launch.[41] The purpose of the crosswaivers is to spread the risk of loss as widely as possible so that one company can sustain a loss of a launch or payload without losing all available assets. Possible losses will be smaller. Private parties will be able to afford insurance because the risk exposure is smaller. (4) The operator shall also enter into a crosswaiver with the Secretary of Transportation.

While the statute requires a crosswaiver of claims, courts will not read a crosswaiver into the contract between the parties if they neglect to include it. The issue arose in the case of *INTELSAT* v. *Martin Marietta*, 763 F. Supp. 1327. The court held that it would not enforce a crosswaiver if it was not literally included by the parties in their contract.[42]

In case another state party to the Liability Convention brings claims against the United States in excess of the statutory liability limits, then the Commercial Space Launch Act makes the U.S.Government (the Secretary of Transportation) liable for damages in excess of the liability limits up to $2 billion. Above that amount it is assumed that special legislation would have to be adopted in order to meet any liability of the United States under the Liability Convention which does not have a limitation on liability.[43]

While the licensing of private launch operators will have the benefit of limiting liability, insurance is expensive. The cost of insurance becomes part of the private launch operators cost

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[37] 42 U.S.C. 4321 et seq.

[38] 49 U.S.C. 70112.

[39] Note that the FAA required Bert Rutan to obtain third party insurance in the amount of only $3.1 million, see Hughes & Rosenberg *supra* n. 29 at 37.

[40] Hughes & Rosenberg *supra* n. 29 at 56.

[41] Larsen, Cross-Waivers of Liability, Proceedings of the 35th Coll. on the Law of Outer Space, at 91 (1992).

[42] *Id.* In this case the reason for the omission was that the contract was negotiated before entry into force of the Commercial Space Launch Act, but the launch took place after the Act entered into force.

[43] 49 U.S.C. 70113.

of launch and increases the total price of the launch. A government launch operator is not required to obtain launch insurance. It may be argued that the government operator therefore has a competitive advantage over the private operator.[44] Another view is that the Government self-insures.

2. Special Regulation of Commercial Launch of Humans into Outer Space

Commercial use of reusable launch vehicles (RLVs) to launch humans into outer space is still in the embryonic stage. In 2004 the U.S. Commercial Space Launch Act was amended to give the FAA authority to issue a private commercial launch license for a space vehicle to carry human beings for compensation in order to encourage and promote safety of commercial vehicles designed to carry human beings.[45] The FAA set standards for design and operation of launch vehicles to protect the health and safety of the crew and the flight participants. These standards concern design features and operations that may cause injuries during space flight.

Risk Sharing and Informed Consent: Prior to executing any contract or other arrangement to employ a prospective crew member, the holder of a license or permit must notify the crew members and flight participants that the United States Government has not certified the launch vehicle as safe for carrying crew or space flight participants. [46] The law does not require crew members to waive potential liability of the licensee or permit holder. Private commercial human space flight is considered to be at an early stage of development. The FAA has little experience with safety of human space flight, therefore the space flight participants must give their written consent to participate in the space launch and reentry.

In this way the risks of the flight transfer to the space flight participants themselves.. The flight operator can escape liability and the participants do not have benefit of coverage under the liability insurance policy for the launch.[47] Because adequate consent is such an important element of human space flight, the FAA has issued guidance about what constitutes informed consent. Adequacy of informed consent will depend on the kind of spacecraft used for human space flight. The risks involved in flying a spacecraft like the space shuttle will vary from the risks involved in flying a spacecraft like the Apollo. Whether an operator can adequately inform a space participant of the risks involved in a complex spacecraft like the space shuttle is an open question. This is an important issue relevant to viability of the informed consent. If disclosure is insufficient, then the statutory requirement has not been met.[48]

Qualifications of Flight Crews and Participants: Flight crew and flight participants on U.S. licensed launches must comply with U.S. laws regarding the launch. Space flight participants (for example tourists onboard) are defined as anyone who is not a member of the flight crew. Under this distinction between crew and participants, crew members would be entitled to assistance

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[44] Lee, Legal and Policy Aspects of Launch Services Provided by Governmental and Private Providers, paper presented at the Bangalore, India, Conference "Bringing Space Benefits to the Asian Region," 26-29 June 2005.

[45] Public Law 108-492; Hughes & Rosenberg, *supra* n. 29.

[46] Hughes & Rosenberg, *supra* n. 29, at 51-60. The FAA wants crews and flight participants to know clearly that the launch vehicle does not meet FAA certification standards.

[47] 49 U.S.C. 70112.

[48] Hughes and Rosenberg *supra* n. 29, at 55, 59.

under the Aid to Astronauts Treaty, [49] but flight participants would not be so entitled. The holder of the launch license or permit may not launch into outer space or reenter Earth unless the flight crew has been adequately trained and conforms to the FAA medical standards. The pilot of a U.S. reusable launch vehicle (RLV) flying in U.S. airspace must have an FAA pilot certificate, and the flight crew must have FAA 2d class medical certificates. (The FAA requires 2d class certificates for commercial non-airline functions. Pilots of scheduled air service must have more stringent 1st class medical certificates.) The flight participants must also be medically fit. The crew must be trained in air as well as space flight. DOT, for reasons of safety, requires the members of the flight crew to be carefully trained to perform their crew functions. Furthermore, the flight participants must be restrained from any interference with the flight crew's operation of the space vehicle.

Government Monitor: The launches will be monitored by the Government. FAA may suspend a license when a life support on board the space or reentry vehicle fails and results in serious accident. The suspension will terminate when DOT ascertains that the license holder has taken steps to remedy the cause of the accident. DOT can also modify the license to remove the likelihood of accidents.[50]

Dependable Life Support Requirement: Flight crew and flight participants need dependable life support within the space vehicle. Thus the RLV operator must provide a controlled environment (supply of air, atmospheric pressure, air circulation, have reserve oxygen, control humidity, control the concentration of gas and particulates that may be inhaled, provide storage to avoid interference with flight, and develop plans to mitigate decompression). Flight crew must be able to suppress fires on board the space vehicle and prevent the crew from being incapacitated.[51]

Design of Space Vehicle to Avoid Accidents: Most accidents involve human factors. Therefore the space vehicle must be designed to prevent the possibility of human errors. ("Human factors engineering" includes elements of psychology, physiology, engineering, ergonomics and medicine). The flight crew could lose consciousness if subjected to uncontrolled extreme acceleration, noise and vibration. Space vehicles must therefore be designed and operated so that the crew can tolerate these factors. [52]

Purpose of New US Legislation: The purpose of the new U.S. legislation is to foster and promote private commercial launch initiatives towards human space flight. Although the space law treaties did not clearly visualize such private initiatives, these activities and the new U.S. legislation appear to be in harmony with the Outer Space Treaty, Art. 1, agreement that use of outer space shall be the province of all mankind. The new U. S. legislation is intended to carry out the Outer Space Treaty, Art VI, responsibility of national oversight. Furthermore, the U.S. is paying "due regard to the corresponding interests of other States Parties to the Treaty." [53] The U.S. is also aware of its potential liability under the Liability Convention regarding the activities of the commercial operators, and US regulation of these activities is intended to make them safe.

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[49] *Supra* n. 3.

[50] 49 U.S.C. 70107.

[51] See FAA Guidelines at http://ast.faa.gov.

[52] *Id.*

[53] Outer Space Treaty, supra n. 1, Art. IX. Also see extensive description of new legislation in Hughes and Rosenberg, *supra* n. 29, at 43 – 72.

3. Regulation of Debris in Outer Space

The FAA has adopted regulations requiring that an applicant for a launch license must make efforts to mitigate the dangers of debris formation. The applicant must plan to prevent collisions among the components of the launch vehicle and the satellite being launched.[54] Reusable launch vehicles must also avoid endangering human presence in outer space.[55] Other U.S. government agencies such as the Federal Communications Commission and the National Oceanic and Atmospheric Administration also require debris mitigation by applicant for permits. These national debris mitigation regulatory requirements conform with the international voluntary debris mitigation rules adopted in 2002 by the Inter-Agency Space Debris Coordination Committee (IADC).[56]

4. Conclusion

The U.S. Commercial Space Launch Act only regulates launch and de-orbit of space objects. It does not regulate operations in outer space after a launch In the absence of a clear causal connection to a licensed launch or reentry, operations in orbit would not be subject to the FAA statutory responsibility.[57] However, additional US national legislation establishing legal authority for NASA, or relating specifically to military uses, radiofrequencies, orbital slots, remote sensing, debris mitigation, registration of satellites applies.

B. Australian Regulation

Australia is well suited for space launches because of its wide open spaces removed from dense urban centers and its proximity to the Equator. Australia adopted its Space Activities Act in 1998. [58] Australian law draws much on the U.S. experience with the U.S. Commercial Space Launch Act. The purpose of the Australian Act is to implement the outer space treaties; attract investors in outer space; transfer the liability of the Australian Government under the Liability Convention to the private launch operators, and to create a safe environment for launches. In addition to the Space Activities Act an applicant for a space launch must also comply with the Australian Radiocommunications Act of 1992 to obtain a cleared radiofrequency, the Civil Aviation Safety Regulations of 1998 to clear airspace, the Customs Regulations of 1998 in order to comply with export controls on national security assets, the Customs Tariff Amendment Act of 2001, the Transport Safety Investigations of 2002 regarding accident investigations, and the special regulations regarding the Christmas Island Launch Center.

Similar to the US Commercial Space Launch Act, the Australian Space Activities Act [59] provides for authorization and supervision of private space activities through issuance of

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[54] 15 Code of Federal Regulations 415.39.

[55] 14 Code of Federal Regulations 431.43.

[56] For excellent review of debris in outer space, see Mirmina, Reducing the Proliferation of Orbital Debris: Alternatives to a Legally Binding Instrument, 99 Amer. J. Int'l Law, 649.

[57] Hughes and Rosenberg, Space Travel Law (and Politics): The Evolution of the Commercial Space Launch Amendments Act of 2004, *supra* n. 29, at 21.

[58] See Space Activities Act (1998). http://www.aph.gov.au; see text in Legal Framework for Privatising Space Activities, Project 2001, at 340. For excellent detailed explanation of the Australian Space Activities Act, see Ricky Lee's book, The Australian Legal & Regulatory Framework for Space Launches, *supra* n. 23.

[59] *Id.*. See http://www.industry.gov.au for further details.

licenses and permits, and limitation of the licensed launch operators' liability. Launches are registered in accordance with the Registration Convention. Australia has entered into a number of bilateral cooperation agreements which are also implemented by the Act. Violations of the Act may result in penalties. Launch accidents will be investigated.

The Australian Space Launch Act specifically applies at 100 kilometer altitude above sea level. In this respect Australia differs from the United States Act which does not contain a reference to a specific altitude. This provision is a good example of how states in their national legislation can determine legal issues which the international forum, COPUOS, is unable finally to resolve. [60]

The Australian Space Activities Act regulates commercial launches of Australians both in Australia and abroad.[61] The Act is specific in nature in order that Australia can meet its obligations under the Outer Space Treaty and control its risk exposure under the Liability Convention. The Act governs both launches into and reentry from outer space, and it requires an overseas launch certificate for a launch outside of Australia. Furthermore, a launch operator must obtain a special authorization for return of an overseas launched space object to Australia. Finally, a launch operator may obtain an exemption certificate for an emergency launch.

a. Commercial Launch Facility License:

Under Australian law the private operator must launch from an authorized launch facility.[62] Whereas commercial launches in the United States most frequently take place at a government operated launch facility, the Australian Act assumes active launches from private launch facilities. The Act, therefore, places special emphasis on obtaining a license to operate a launch facility in Australian territory. The license is designed for a particular kind of launch craft being launched in a specific direction. Any changes in launch craft and launch direction requires a variance or a new license.

Consequently a launch operator must first be assured of a valid launch facility license. To obtain such a license the launch facility operator must show the following: competence to operate the launch facility; compliance with Australian environmental laws; assurance that the public health and safety risks of the launch are reasonable; that the planned flight will be safe; and that the launch facility and the launch itself will be safe. The launch must not endanger Australian national security.[63]

In special cases the Australian Government may recognize a foreign government's certification regarding the engineering and technical details of a launch facility and of the launch operation itself.[64] The operator must file an application for such recognition along with the launch application. Such recognition of a foreign government's certification encourages foreigners to launch in Australia. It is also efficient because it avoids duplication of certification efforts.

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[60] See Yun Zhao, National Space Legislation, with Reference to China's Practice, paper presented to the Bangkok Space Law Conference 2006, Asian Cooperation in Space Activities: A common Approach to Legal Matters.

[61] Lee, The Australian Legal & Regulatory Framework for Space Launches, *supra* n. 23, at 10.

[62] Australian Space Activities Act, Section 18; Lee, *supra* n. 23 at 12-22.; also see Australian Space Licensing and Safety Office at http://www.industry.gov.au.

[63] *Id.*

[64] *Id.*

With the launch facility application the applicant must file: (1) a management plan explaining how the entire launch facility will be managed; (2) an environmental protection plan showing capability of monitoring environmental effects and complying with Australian environmental laws; in conjunction, the applicant must also produce a statement of compliance from an independent environmental expert; (3) an emergency plan indicating how the operator will meet potential emergencies; (4) a technology security plan for assuring compliance with Australia's obligations under arms control agreements to prevent unauthorized access to sensitive information; (5) a risk hazard analysis plan showing how the operator will comply with Risk Hazard Analysis Methodology of the Flight Safety Code; (6) a flight test plan regarding launch of new technology vehicles describing the reason for the flight, the configuration of the craft, the system for tracking the vehicle, launch and launch termination procedures, and reporting the flight test to the Australian Government.[65]

b. Launch Permits for Australian Launches:

To obtain a permit for launch in Australia the private commercial operator of the launch vehicle must evidence: (1) a program management plan showing applicant's planned management of ground operations, adequacy of flight safety, launch procedures, employee awareness of their duties and ability to meet emergency situations, and communication arrangements; (2) a technology security plan indicating procedures for prevention of unauthorized access to technology information as well as compliance with national security restrictions; (3) a flight safety plan indicating compliance with the Australian Flight Safety Code, data supporting risk analysis and a report to the government on compliance with and independent assessment of compliance with the Flight Safety Code; (4) compliance with the insurance plan that indicates the name of the insurer, risks covered, and insurer's certification of sufficient financial means; (5) an environmental plan showing preparations for monitoring and mitigating environmental hazards, and the means of carrying out such plans.[66]

The applicant is required to obtain insurance coverage against possible third party liability as well as insurance against possible liability for damage caused to the Australian government during launch operations. Alternatively, the applicant may self- insure by proving that applicant has sufficient assets to cover the potential liability. The required insurance is either 750 Million Australian dollars or maximum probable loss (MPL) as determined by a government formula (taking into consideration probability of casualty loss, third party property loss, environmental damage and economic loss, and cost of accident investigation in case of a failed launch.[67]

c. Australian Authorization to Launch Outside of Australia:

Australia may enter into intergovernmental agreements with foreign government allowing them to supervise launches overseas by Australians. Thus, if an Australian citizen launches in the United States, Australia may defer oversight responsibility to the United States government (similar to U.S. deference to Australia if a US citizen launches in Australia). In the

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[65] *Id.*

[66] Australian Space Activities Act, Section 26, See Lee *supra* n. 23 at 23 – 37; see also Australian Space Space Licensing and Safety Office, at http://www.industry gov.au.

[67] *Id.*

absence of an intergovernmental agreement, the Australian applicant must (1) meet the Australian insurance requirements, (2) show that threats to public safety and health are low, (3) show that the applicant does not offend Australian national security interests, (4) provide evidence of the insurance coverage required for domestic launches.[68]

d. Registration:

The Australian Act creates a Registrar of Space Objects to record all the information required by Article IV of the Registration Convention. The Australian government has been diligent in registering this information with the United Nations in accordance with the Registration Convention.[69]

e. Liability:

The Australian act establishes a fixed period of thirty days after the launch, or from beginning of reentry movement to the time of landing on the surface of the Earth during which period the launch operator can be held liable. In order to recover damages from a launch operator, the claimant must prove that damage occurred during the thirty day liability period. Claims are limited only during this liability period. [70]

Liability under the Australian Act implements the Liability Convention in that the launch operator is absolutely liable for loss and damage to the surface and in the air. Damage to objects in outer space will result in liability only if the claimant can prove that the damage was caused by the fault of the launch operator.

Does the Australian Act govern liability outside of Australian territory? Extraterritoriality of liability under the Australian Act is questionable. An Australian launch operator could possibly be sued outside of Australia thereby avoiding the Australian Act's limitation of liability. Thus a foreign party could be motivated to bring a large claim abroad.[71]

f. Regulation of debris in outer space:

Australia, like the United States, requires an applicant for a launch license to mitigate debris formation. The applicant must present a plan to prevent impact of debris on designated areas. Those designated areas are primarily densely populated areas and valuable facilities such as oil wells and factories.[72]

g. Conclusion:

The Australian Space Activities must be read in the context of other acts relating to outer space, for example laws on radiocommunications, orbital slots and military uses, Ricky Lee points

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[68] Australian Space Activities Act, Section 12; Lee, *supra* n. 24 , at 47 – 44. See Australian Space Licensing and Safety Office, at http://www.industry gov.au.

[69] Australian Space Activities Act, Section 76; Lee *supra* n. 23, at 50-51.

[70] Australian Space Activities Act, Sections 63 et seq.; Ricky Lee *supr*a n. 23 at 51 – 67. Australian Space Licensing and Safety Office, at http://www.industry gov.au.

[71] Lee, *supra* n. 23, at 59 – 63.

[72] *Id.* at 29 – 33.

out several problems with the Australian launch license. For example, the permit includes both the launch and reentry of the launch vehicle, however, it does not clearly regulate reentry of the space object being launched. Lee suggests that the government should specifically include the return of the satellite from outer space in an Authorization of Return.[73] It would be in the interest of the launch applicant to request authorization of the space object while in outer space and during reentry in order to bring the existence of the object under Australian supervision and in turn seek to obtain limited liability protection while in outer space and during reentry.

C. National Regulation by China

China has adopted the four basic international space law treaties regulating commercial space activities, but China has not adopted the 1979 Moon treaty. China relies on these international treaties for regulation of commercial space activities. China has not rushed to adopt national legislation in the nature of the Australian and United States laws. There is no Chinese national legislation specifically regarding private commercial space enterprise[74] however, China has national legislation of limited application and is now considering comprehensive space legislation. China's White Paper[75] on its space activities, issued in 2000, states that China's primary space policy focus is on:

> Adhering to the principle of long-term, stable and sustainable development and catering to the development of space activities and serving the State's comprehensive development strategy; upholding the principles of independence and self-renovation and actively promoting international exchanges, self-reliance and self-renovation and actively promoting international exchanges and co-operation; selecting a limited number of targets and making breakthroughs in key areas according to China's national situation and strength; enhancing the social and economic returns of space activities and paying attention to the motivation of technological progress; sticking to integrated planning, combination of long-term and short-term development, combination of spacecraft and ground equipment, and coordinated development.

China has promulgated national procedures for registration of space objects. The registration office is maintained by the Chinese Commission for Science, Technology and Industry which in turn passes the registration information to the Ministry of Foreign Affairs for registration with the United Nations, as required by the Registration Convention.[76] The Commission for Science, Technology and Industry has also promulgated regulations authorizing the Commission to issue licensing for non-military launches and reentry of space objects.[77]

The application for a non-military launch license as well as the launch permit itself must describe the space project, the time and place for the launch, the duration of the permit, and

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[73] Lee *supra* n. 23 at 23. Lee's comment on lacking oversight of private activities in outer space applies also to similar legal problem existing under the U.S. Space Launch Act, *supra* at footnote 57.

[74] Yun Zhao, National Space Legislation, *supra* n. 60, at 13.

[75] The State Council Information Office, China's Space Activities, dated Nov 2000, www.cnsa.gov.cn; Yun Zhao *supra* n. 60 at 13.

[76] Zhao *supra* n. 60 at 15.

[77] Ministry of Foreign Affairs, Commission of Science, Technology and Industry for National Defense, Interim Measures, 2002, Art 4 . Zhao, *supra* n 60 at 15.

must indicate the office issuing the permit. The licensee must also obtain third party liability insurance. The licensee planning to launch a space object manufactured in China must first obtain a permit for the space object to leave the point of manufacture. Such permit must be obtained six months before the planned launch. The Science, Technology and Industry Commission's interim measures are linked to possible civil and criminal penalties for fraud, for unauthorized launches, and for abuses leading to liability of and damages to the State.[78]

The Chinese national regulations also concern national security, because space objects have military value. Export of objects having military value is controlled by the Chinese government. Satellites, launchers and missiles are included on the Chinese Military Products Export Control List and are controlled accordingly.[79]

China is considering adoption of comprehensive legislation on outer space activities. In the short term, however, the Chinese Government will experiment with piecemeal regulations of outer space activities. China plans to study the results of short term regulations. Based on the accumulated experience China will then proceed to adopt comprehensive legislation on licensing of commercial enterprises, liability, insurance, financing, international cooperation and coordination. Such comprehensive legislation will implement China's obligations and duties under the international space law treaties.[80]

In conclusion, China has considerable commercial space activity. Most of it is governmental. China has provided launches into outer space for foreign satellite operators at favorable prices. In view of further development of commercial space activities, China may adopt national legislation.

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E. National Legislation on Space Activities by India

India relies mainly on the existing four space law treaties for its regulation of commercial space activities.[81] Under the Indian Constitution, Art 53, the Indian Government may use its executive powers to implement international treaties without further national legislation. However, national legislation could be required if the government of India were to incur financial liability under the Liability Convention, because an act of the Legislature would be required to provide funds to pay for liability of the government under the Convention.

The Indian Space Program is administered directly by the Office of the Prime Minister.[82] Within this framework, the Indian Space Commission establishes national space policy. That policy is implemented by the Department of Space through four agencies: The Indian Space Research Organization (ISRO); the National Remote Sensing Agency (NRSA); the Physical Research Laboratory (PRL) and the National Mesosphere-Stratosphere-Troposphere Radar Facility (NMRF).

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[78] *Id.*

[79] Id. Regulations on Export Control of Missiles and Missile-related Items and Technologies

[80] Zhao *supra* n. 60 at 15-18. Regulations on Control of Military Products Export; www.wsichina.org/ subprogram.cfm?subprogrammi=2&charid=1#00008) .

[81] For an excellent review of Indian regulation of space activities, see Ranjana Kaul, National Space Legislation: A Blueprint for India, Proceedings of the ISRO – IISL Space Law Conference 2005 in Bangalore, "Bringing Space Benefits to the Asian Region" at 2-3.

[82] See www.isro.gov.in for information about Indian national regulation of space activities.

The Indian Government space policy statement of 1999 [83] outlines how India is developing commercial uses of outer space. Currently, almost all of India's impressive space program is administered by the government. India operates a significant number of satellites used for communications, educational, medical and military purposes. India has become a reliable national and international supplier of remote sensing data. India operates several launch facilities and launch vehicles in India. Indian launch facilities are owned and operated by the Indian Government through the Indian Space Research Organization (ISRO), so there is no competition between Indian launch facilities.

Commercial space activities are subject to the guidelines and regulations issued by the Department of Space and other relevant government agencies. [84] In 1992 The Indian Government established the Antrix Corporation. It is a government corporation. Its function is "to facilitate commercialization of space activities and to accelerate export of space launch services as a means of recovering part of the budget expenditures in this sector by the government."[85] In view of increasing demands for space launch facilities and services, India's next step is to permit and encourage private operators to engage in these activities.[86]

Private operators may obtain a launch license; for example in 2002 the Indian Government issued a private launch license for launch a communications satellite, however the license was not used. Usually private commercial communications operators lease capacity from, or through, ISRO. For that purpose ISRO, issued Norms, Guidelines and Procedures for Implementation of a Policy Framework for Satellite Communications for India.[87]

In formulating national laws and regulations for private operators, India is not only examining its own unique economic, social and political circumstances; India is also evaluating the experiences of other countries which have already established national regulation of private commercial operators of space services. For example the U.S., Australian and Russian experiences are valuable precedents.

Space commerce is a vital part of India's economy. India's telecommunications market is the fastest growing telecommunications market in the world. International companies are anxious to enter this market. Therefore, at the present time, a great volume of foreign investments is pouring into Indian high technology commerce, including space commerce. Foreign investments were made possible by a 2005 Indian liberalization of foreign investment laws raising the permissible level of foreign investments from 49% to 74% of Indian companies' capital. However, investments above 49% are still subject to approval by the Indian Government. Furthermore, India discourages investments from "unfriendly countries". For example, an application by a Chinese company for a trading license was rejected because the Indian Government decided that the company had close links to Chinese military forces. India's space policy is strongly influenced by national security concerns. The Indian Government is preparing new legislation to prevent foreign high technology companies from doing business in India if they endanger India's national security. New legislation is being prepared to further

[83] See www.dot.in; see Kaul *supra* n 81, at 2-19.
[84] *Id.*
[85] *Id.* at 2-29
[86] *Id.* at 2-20.
[87] www.isro.org [Norms], Kaul *supra* n 81, at 2-26.

restrict dangerous foreign investments in India.[88] India participates in international efforts to stop proliferation of missile technology to other countries. The government of India is concerned that its military space technology be preserved for its national security purposes. Thus even an Indian private commercial satellite system must obtain a security clearance from the Ministry of Home Affairs.[89] In conclusion, India's space policy is developing towards greater private enterprise in space activities. Prospective national legislation is being prepared.

F. National Legislation on Space Activities by Russia

In the post cold-war period, Russia became the main successor to the former Soviet Union. Russia inherited most of the space launch capability. While Russia suffered economically in the post cold-war period, it also enjoyed an economic advantage from excess launch capability that could be and was offered at attractive prices to Western commercial operators. Consequently, a major part of Russia's space capability was dedicated to private commercial activities and Russia became a major commercial launch operator.[90] Russia aggressively marketed private launches into outer space.

The Russian Law on Space Activity entered into force in 1993.[91] Its primary purpose is to implement and enforce the international space treaties of which Russia is a party.[92] Other purposes are development of 'entrepreneurial activity,' maintenance of safety, environmental protection, protection of intellectual property, and promotion of science and national security.[93] The law differs significantly from the Australian and U.S. commercial space laws which focus on licensing private operators. Rather, the focus of the Russian law is on giving legislative authority to state agencies to engage in state activities and to control participation by non-Russians.

Under the Russian Law, the Russian Space Agency is made responsible for space activities. The Russian Space Agency, in conjunction with the Russian Ministry of Defense, allocates all budgetary resources for uses in outer space activities. The Russian Space Agency has legal authority to license outer space activities, supervise safety, and interact with international organizations on space activities.[94] The Ministry of Defense is responsible for military uses of outer space and, in cooperation with the Russian Space Agency, it establishes and implements the Russian Space Programs.[95]

The Russian Space Agency supervises the space activities of Russians citizens as well as activities of foreigners while under Russian jurisdiction, if their activities include "tests, manufacture, storage, preparation for launching and launching of space objects, as well a control

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[88] Saritha Rai, As Foreign Investment Rises, India Addresses Security Concerns, N.Y. Times, 24 Aug. 2006 at C-4; also see Mehmood Pracha, Commentary Paper on National Space Legislation, ISRO – IISL Space Law Conference, 2005, at 2-59.

[89] www.mib.nic.in ; Kaul *supra* n. 81, at 2-23.

[90] Gubarev, Lavrov and Teselkin, Commercial Space: Major Direction or Activities, Legal Framework and General Privatization Policy of Russia, Legal Framework for Privatising Space Activities, Project 2001, at 108 and 113.

[91] The Russian Federation Law on Space Activity 1993, Legal Framework for Commercial Launch and Associated Services, Project 2001, at 313.

[92] *Id.* Art 4.

[93] *Id.*

[94] *Id.* Art. 6.

[95] *Id.* Art. 7.

over space flights." The Russian Space Activities Act furthermore provides: "The types, forms, and terms of licenses, the conditions and procedures for their issue, withholding, suspension or termination thereof, as well as other questions of licensing shall be regulated by the Russian legislature." [96]

The Russian Space Program also governs construction of space hardware. Construction is performed by contractors. Mixed Russian and foreign contractors may construct space hardware, however, the foreign participation in Russian companies may not exceed 49%.[97] Preference is given to Russian participants.[98]

Art 17 of the Russian Space Law requires registration of Russian space objects. Furthermore, Russian space objects must be marked with national markings (analogous to markings of airplanes under Article 20 of the Chicago Convention.[99]

Control of flight in outer space is by the Russian Flight Control. Flight Control may permit foreign spacecraft to enter into Russian air space as follows:

> The space object of a foreign state can execute a single innocent flight through the air space of the Russian Federation with the purpose to insert such an object into an orbit around the Earth or further in outer space, as well as with the purpose to return it to the Earth under the condition of advance notice of appropriate services of the Russian Federation about time, place, trajectory and other conditions of such flight.

The Russian Flight Control will coordinate with local authorities as well as with foreign countries and international organizations.[100]

Russian spacecraft must be under the command of Russian cosmonauts. The commander is fully responsible for the flight, the safety of the crew and other participants, and the preservation of the space craft. Foreigners may be carried on Russian spacecraft, but they must be trained in Russia, be under the command of the Russian commander and are subject to Russian law while in the space craft. [101]

The Russian Space Agency and the Ministry of Defense are jointly responsible for the safety of space objects. Space objects must function and operate in accordance with state safety regulations.[102] The cause of accidents must be investigated. Conclusions about the cause of accidents may be appealed to the courts of justice.[103] The Russian State government shall conduct search and rescue for lost space objects and cosmonauts, and shall clean up after accidents. Costs are attributed to the Federal Russian Government.[104]

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[96] *Id* Art. 9.

[97] *Id.* Art 14.

[98] *Id.* Art. 16.

[99] Under the Registration Convention, Art. 4, *supra* n. 1, states may designate space objects with markings, analogous to markings of airplanes under Article 20 of the Chicago Convention, *supra* n. 7.

[100] Russian Federation Law on Space Activity, *supra* n. 91, Art 19.

[101] *Id.* Art 20.

[102] *Id.* Art 22.

[103] *Id.* Art 23.

[104] *Id.* Art 24.

Foreign operators doing business in Russia enjoy the same legal rights as domestic operators. Foreign companies receive full protection of patents and copyright and other intellectual property rights enjoyed by Russian companies, on a reciprocal basis. [105]

Operators of space objects must obtain liability insurance in the amounts required by the Russian Government. Insurance proceeds must be applied to compensate personal injury losses and damages sustained by cosmonauts and other personnel.[106] In Russia, compulsory insurance is required for space activities in order to cover possible liability to third persons and among private parties.[107]

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Any legal disputes involving foreign companies functioning in Russia shall be subject to Russian law, unless otherwise agreed by international agreement.[108]

Finally, liability is extensively regulated under Russian law. The Russian Government guarantees full compensation for direct damages resulting from outer space activities.. Full compensation must be paid by the responsible commercial companies and individuals. Liability shall be based on proof of fault. Liability shall be limited by the amount of insurance obtained.[109]

According to Russian space law experts Vladimir Gubares, Alexei Lavrov and Sergei Teselkin: "If a foreign customer of a space launch is not a government juridical person, Russia is, actually, the only launching country. In our opinion, on the basis of Article VII of the 1972 Convention, the conclusion may be drawn that in these cases the provisions of the 1972 Conventions will not be applied to the Russian Federation. Russia will only be liable to its citizens and / or juridical persons on the basis of civil liability in conformity with national legislation of the Russian Federation." [110] Under Russian law juridical persons are subject to full indemnification for loss and damages. Space activities are considered to be ultrahazardous. Therefore the perpetrators are fully liable to third parties.[111]

In conformity with the Liability Convention, the Russian Government is liable for loss and damages caused by a Russian state owned spacecraft on the Earth's surface or in airspace.. This liability is absolute. Liability for loss and damages caused in outer space is based on proof of fault. The compensation shall be in proportion to the extent of fault (comparative negligence).[112]

Russian commercial launch operators always insert clauses into the launch contracts requiring insurance covering possible loss and damage to launch facilities and insurance coverage for civil liability to third parties. The purpose of this compulsory insurance requirement is to cover Russia's potential liability as the launching state under the contracts to launch foreign

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[105] *Id.* Art 27.

[106] *Id.* Art 25.

[107] Gubarov, Lavrov, Teselkin, Civil Liability to Third Parties in the Course of Russia's Co-operation in Outer Space: Legal Regulation Issues, Legal Framework for Commercial Launch and Associated Services, Project 2001, at 162.

[108] Russian Federation Law on Space Activity, *supra* n. 90, Art 28.

[109] *Id.* Art. 29.

[110] Gubarov, Lavrov and Teselkin, Civil Liability to Third Parties in the Course of Russia's International Co-operation in Outer Space: Legal Regulation Issues, *supra* n. 107, at 162.

[111] *Id.* at 162-163.

[112] Russian Federation Law on Space Activities, supra n. 91 at. Art 30. This provision conforms to the Liability Convention, *supra* n. 3, Arts. 2 and 3.

space objects on favorable cost terms.[113] In conclusion, compared with the extensive Australian and U.S. national regulation of private commercial launches into outer space, Russia has little national legislation on domestic private launches and private commercial space activities.

G. U.K. National Legislation on Space Activities

The United Kingdom Outer Space Act of 1986[114] requires U.K. nationals to obtain a license from the Secretary of State in order to launch, procure a launch or operate a space object. The objective of the Act is to include within its scope any person who might trigger UK responsibilities under the international space law treaties.[115] The U.K., like Australia and United States, wants to avoid overlapping conflicting jurisdictions. Therefore the Act permits the U.K government to enter into coordination agreements with other countries under which the UK may cede jurisdiction to another country, as long as the UK obligations under the space law treaties are fulfilled.[116]

The U.K. Act assigns administrative duties to the Secretary of State; but the Act is in fact administered by the British Space Center (BNSC). Pursuant to the Act the U.K. Secretary of State may issue a launch license if the public health and safety of persons and property are adequately protected, if the UK international obligations under the space law treaties are satisfactorily protected, and if U.K. national security is not impaired. The Secretary issued regulations implementing the Act. The regulations state (1) the form and content of the license application; (2) procedures for processing the application; (3) time limits, and (4) license fees.[117] Grant of the license application is contingent, *inter alia*, on the UK Government being able to inspect the launch facilities; examine the equipment being used in the launch, including the launch vehicle; obtain all necessary information pertaining to the date and location of the launch and the basic parameters of the intended orbit for the space object being launched; have access to documentation relevant to the launch; receive advance approval of any deviation from the planned trajectory; be assured of adequate environmental protection; know that there will no interference with activities of other persons; be assured that breach of UK's obligations under the international space law treaties will be avoided.; and be assured of adequate protection of the national security of the U.K.. The launch licensee is required obtain insurance in the public market to compensate innocent third parties on the surface who may be injured by falling space objects that would cause U.K. liability under the Liability Convention. Any liability incurred by the U.K. Government under the Liability Convention must be reimbursed by the licensee. Finally, the licensee is required to comply with U.K. Government regulations regarding disposal of the payload in outer space (for example, space debris regulations).[118]

Transfer of a U.K. launch license from one person to another is permitted at the discretion of the Secretary of State. Licensees must comply with the law, or they may be

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[113] Gubarev, Lavrov and Teselkin, *supra* n 107, at 166.

[114] U.K. Outer Space Act of 1986, 1986 Chapter 28, see Legal Framework for Commercial Launch and Associated Services, Project 2001 Proceedings, at 337. For a very thorough analysis of the U.K. Outer Space Act see Prof. Francis Lyall, U.K. Space Law, Proceedings of the 35th Colloquium on the Law of Outer Space, at 385 (1992).

[115] . *Id.* Sec. 2. Lyall, *supra* n. 114, at 386.

[116] *Id.* Sec. 3.

[117] *Id* Sec 4; Lyall *supra* n. 114 at 388.

[118] *Id.* Sec. 5.

forfeited. The Secretary may revoke or suspend a license if conditions for issuing the license no longer exist, or if termination or suspension is required for reasons of public health and national security or as necessary to comply with UK obligations under the international space law treaties.[119] For enforcement of government orders the Secretary may ask the courts to issue injunctions to secure compliance.[120] The courts may, after findings and on reasonable grounds, "issue a warrant authorizing a named person acting on behalf of the Secretary of State to do anything necessary to secure compliance with the international obligations of the United Kingdom or with the conditions of the licence".[121] Violations of the issued license (for example false statements, failure to comply with the license, obstruction of government inspectors, failure to comply with regulations) are subject to fines and other penalties. Violations committed abroad are considered to have been committed in the United Kingdom and thus subject to enforcement under U.K. law. However, "it is a defence for the accused to show that he used all due diligence and took all reasonable precautions to avoid the commission of the offence." [122]

The Registration Convention requires the UK to maintain a national registry of space objects. The registry is maintained by the British National Space Center. It is open for public inspection on payment of a fee.[123] The launch licensee is required to obtain insurance in the public market to compensate innocent third parties on the surface who may be injured by falling space objects that would cause U.K. liability under the Liability Convention. Any liability incurred by the U.K. Government under the Liability Convention must be reimbursed by the licensee.

The Act does not limit the licensee's liability. Unlike the Australian and the U.S. statutes, the UK Act requires full indemnification of the U.K Government for losses or damages resulting from the licensee's activities arising under the U.K. Outer Space Act.[124]

Besides the Act, U.K. nationals are also subject to other U.K. laws, including telecommunications, and intellectual property laws. They are also subject to many multilateral and bilateral international agreements.

H. Objectives of National Legislation on Commercial Space Activities

Countries that have no national space activities do not need commercial space legislation. However, even these countries may experience commercial space business in the near future. Some countries that actively engage in space activities do not regulate their commercial space business or they regulate these activities on a case-by-case basis. The United States and Australia are examples of nations with very developed national space legislation. The U.K. has adopted laws to satisfy domestic needs. Russia, China and India are developing state economies into private enterprise economies and are contemplating national legislation regulating private space activities. Discussion of the main objectives and benefits of adopting national legislation on commercial space activities follows.

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[119] *Id* Sec 6; Lyall, *supra* n. 114 at 386.
[120] *Id.* Sec 8.
[121] *Id.* . Sec 9.
[122] *Id.* Sec. 12.
[123] *Id.* Sec 7; Lyall, *supra* n. 114, at 385.
[124] *Id.* Sec 9.

1. International Law Responsibility for National Activities under the Outer Space Treaty Art. VI and the other Space Law Treaties

The Outer Space Treaty, Art VI, requires states parties to authorize and continuously supervise their private commercial activities in outer space. Some states have been surprised to learn that one of their national non-governmental entities has, without their knowledge, triggered the government's treaty responsibilities under Art. VI by privately launching a space vehicle or contracting for a foreign launch of a payload into outer space.[125] The launch may be an innocent student project or the payload may be the remains of a dear relative or it may be a commercial satellite regarding which the identity of the launching state is ambiguous.[126] It may happen that neither the launch operator nor the owner of the payload were aware of the extent to which international space law governed their outer space activities, but they nevertheless may have triggered the international responsibility of their governments. States can avoid surprises about applicable law governing commercial space activities by adopting legislation. National legislation provides legal notice to their private commercial entities, and also gives specific guidance about how to comply with the prescribed duties and obligations. National legislation not only protects the states against surprises, but legislation can also provide commercial companies with national protection and commercial stability benefiting space commerce.

2. Governmental and Private Liability

The Outer Space Treaty, Art VII, makes state parties internationally liable for damage to other states (and indirectly to their nationals). The Liability Convention makes states absolutely liable for damage by their space objects on the Earth's surface and in the above airspace; and the Convention makes states liable for damage caused by their space objects in outer space upon proof of fault.[127] Potential state liability for the commercial activities of private companies is a risk that states would like to control in order to reduce the risk of loss. The states have less control over private commercial activities than they have over their governmental space activities. Prominent in national regulation is a licensing system that provides governments with the authority to examine and establish the safety of private commercial activities. Under the Australian and U.S. national legislation, private operators, in exchange, receive the advantage of a ceiling on *their* liability. They need this protection against unlimited liability in order to do business, because limited liability enables them to buy insurance coverage. This bargain is so favorable to the launch operators that they deliberately seek launch licenses from states that can provide a ceiling on liability. In theory, the authorizing states will require the private launch operators causing damage to reimburse the authorizing government from the insurance coverage so that the government can meet its obligations under the Liability Convention. However, the bargain is not perfect because it exposes the authorizing states not only to default liability but also to liability for damages which exceed the liability ceiling granted to the private launch operators. Governments seek to resolve this risk dilemma through an analysis called Maximum Probable Liability (MPL). The MPL is an economic risk assessment that estimates all probable risks. Each application is subject to this risk probability analysis before a launch license is granted. The MPL has not been exceeded so far in any launches. However, outer space

[125] See discussion of Art. VI at footnote 10 *supra*.

[126] Note that Liability Convention's Art. 1 definition of a "launching state" can be any or all of four countries and none of them may decide to register as the launching state.

[127] Liability Convention, *supra* n. 1, Arts. II and III.

commercial activities are inherently hazardous. The MPL does not exclude the potential for improbable damages of a catastrophic nature, such as the surface impact of a launch vehicle on a large urban location in the center of London, New York , Kuala Lumpur, or a direct collision in outer space with the International Space Station. New kinds of risks for commercial space operations occur constantly as new technology develops and as new commercial activities begin. For example, in the United States private commercial launches of humans into outer space are considered so hazardous that flight participants are asked to assume their own risks.

In the United States the amount of insurance required has been low, sometimes considerably lower than the statutory liability limits. A regulatory liability limit on private commercial operators is an expedient solution which enables the launch business to function. An argument can be made that the launch operators should assume the full cost of their business operation. The limitation on their liability and their government's guarantee that it will assume liability for unpaid damages could be viewed as an economic subsidy to the launch business.

3. Government Safety Requirements for Commercial Space Vehicles

Because outer space activities are inherently hazardous, states adopt regulations in order to assure that space vehicles and their payloads are safe. Safety of commercial space vehicles has many aspects. Safety regulation includes assurance that the launch vehicle will not explode during launch and thus injure people and damage property on the ground near the launch pad and that innocent third parties on the surface are not injured or killed by falling objects. The launcher's employees must be able to conduct a safe launch. Government regulation permits the Government to stop the launch if there is any abnormality. It assures that the space vehicle is safely constructed, the payload is not hazardous and both the space vehicle and the payload can safely reenter.

4. Economic Stability of the Launch Business

Private Commercial space launches are expensive. Profit margins are low. The launch operator must have sufficient money to pay for the hardware, for the cost of the licensing process, for the employees involved in the launch, and for insurance, etc. The applicant needs a secure economic environment in order to launch. Most launches are high cost, charging about $20,000 per kilogram of payload. National regulation induces economic stability by establishing orderly, predictable government oversight.

5. Compliance with Environmental Laws

Launches into outer space are hazardous to the Earth's environment as well as to outer space. It is important to note that the Outer Space Treaty, Art IX, requires states parties to avoid harmful contamination of outer space and also to avoid contamination of the Earth. National regulators (specifically Australian and U.S. regulation) require that the launch application complies with their environmental laws and regulations. For example, the United States conducts an environmental review in accordance with the criteria of the National Environmental Policy Act (NEPA) to insure that the launch does not have a significant impact on the human environment.[128] Australia requires an environmental plan showing preparations

[128] 40 Code of Federal Regulations 1508.4.

for monitoring and mitigating environmental hazards, and means of carrying out such plans.[129] Thus national regulation can be used to effectively avoid environmental problems.

6. National Security Considerations

National security is a very important issue that states want to regulate. States' concerns with national security are so intense that international space commerce takes second place to national security. Commercial space technology often can be used for military purposes. The technology may be dual purpose. For example, global navigation satellite systems and remote sensing satellites can be used for both civilian and military purposes. Rocket launchers can launch both missiles and commercial satellites.

A few examples of international and national agreements and legislation relating to national security concerns follows:

a. The Wassenaar Agreement [130] is the largest existing multinational arms control system establishing export control of conventional arms and dual-use goods and technologies. Participation is voluntary. Members of the Wassenaar agreement must inform its members when arms are transferred from one state to another. Its purpose is to promote transparency, increase responsibility, and establish reporting requirements. The Wassenaar Agreement could potentially control the international spread of arms technology that so intensely concern individual countries such as the United States. To do so, it would have to have broader participation by the developing Asian economies such as India, Pakistan and Southeast Asia, as well as a more effective compliance structure.

b. The Missile Technology Control Regime (MTCR) [131] is a voluntary arrangement of states specifically to stop missile proliferation. 29 member states have agreed to limit and restrict proliferation of missile technology. "Missile" is defined as technology capable of carrying a 500 kg payload at least 300 km as well as delivery of weapons of mass destruction (WMD). (Included are ballistic missiles, space launch vehicles, unmanned air vehicles, cruise missiles including GPS satellites used to guide cruise missiles). Enforcement is divided into two categories according to severity of the danger: Category I is most severe. It is subject to presumption of denial of permission to export. Category II covers wide area of parts, components such a propellants, structural materials, test equipment, flight instruments. They may be exported on a case by case basis.

c. Export Control Legislation: An example is U.S Public Law 105-261, which bars non-US states and foreign companies that launch satellites into outer space from receipt of important sources of technology or other means of enforcement if they violate US national security regulations. The US arms export control legislation establishes the primary importance of national security over business interests. It includes the following elements:

(1) Approval by the U.S. Department of Defense (DOD) of an export license plan..
(2) A crash investigation license for U.S. participants in foreign investigations. DOD will

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[129] Lee *supra* n. 59, at 25 – 29.

[130] The Wassenaar Agreement at www.wassenaar,org.

[131] Missile Technology Control Regime (MTCR), Legal Framework for Commercial Launch and Associated Services, Project 2001, at 375.

monitor such investigations. This requirement does not apply to NATO allies.
(3) An annual report to Congress on export of U.S. satellites for launch by China.
(4) Registration and licensing of all articles, whether of U.S. or foreign manufacture. Nothing may be exported or imported without a license. Violation is a criminal offense.
(5) A prohibition on munitions transactions with countries that support terrorism.
(6) Provision for waiver of trade restrictions by the U.S. President if essential for national security.

d. ITARs and EARs:[132] Effective export control of space assets is maintained by the State Department under the International Traffic in Arms Regulations (ITARS) and by the Department of Commerce under the Export Administration Regulations (EARS). Stricter US export control of space technology was established in 1999 when the US Congress moved responsibility for satellite export control from the Department of Commerce (DOC) to the Department of State (DOS). Satellites were placed in the same export category as military weapons systems. DOS regulation proved to be more extensive, restrictive and time consuming than DOC regulation. Added regulation resulted in added cost. Most of the impact on US business has been felt in the satellite manufacturing side. US market share of satellite manufacturing has declined. Export and import controls are also having adverse effect on the US launch vehicle market.

In conclusion, states need and use legal authority to protect their national security. From the perspective of international space commerce, national security regulations are a significant barrier to trade and development of outer space. There is currently little prospect that national security oversight will be replaced by broader and more effective international trade export controls, such as the Wassenaar agreement.

7. Protection of Space Investments in Space Assets

Adoption of national space legislation sends a message to financial investors that a country protects national and international investments in space commerce. Uniformity, predictability and certainty are the consequences of national legislation. Financiers will feel more confident in making investments if they know the applicable rules. Lawyers advising investors during contract negotiations will better be able to inform their clients of the legal basis for their contracts when they know the legal basis for concluding the contracts. National laws protecting private space investments include laws on space launches, patents, copyright, contracts, and procedure.

Investors will be further assured of the security of their investments when states adopt the (proposed) UNIDROIT Space Protocol to the Convention on International Interests in Mobile Equipment (Cape Town Convention).[133] This treaty regime would establish an international registry of security interests in space assets and would protect all financial interests registered in the registry of financed space assets created by the Space Protocol. The Space Protocol is currently being negotiated in UNIDROIT.[134]

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[132] 22 Code of Federal Regulations, Parts 120 – 130; 15 Code of Federal Regulations, Part 730 et seq.

[133] Larsen, Future Protocol on Security Interests in Space Assets, 67 J. Air. L.& Com 1071 (2002).

[134] http://www.agora.stm.it/unidroit . The Cape Town Convention is now in effect for aviation equipment. As an indication of potential benefits for space commerce, the Aviation Protocol has been particularly beneficial to developing countries by reducing the cost of financing, see James Ot, Protecting Assets, Aviation Week and Space

8. Promotion of National Space Commerce

The U.S. and the Australian space legislation require the responsible government departments to promote space business in addition to authorizing and continuously supervising it. Promotion and safety, though both important tasks, are not always compatible. It may be that in the future safety regulation of outer space activities and promotion of space commerce be assigned to two different government agencies. Conflict easily happens when the government overseer is caught in the middle of the private launch operator's wish to expedite a launch but the government is not sure that the launch is safe and therefore wants to delay issuance of a launch license or stop an unsafe launch. The objectives of supervision and promotion are both admirable, but they should not be combined in one and the same government official.

9. Definition of the Boundaries of outer Space in Order to Ascertain the Scope of National Legislation

Knowing the territory where space legislation applies adds legal certainty and predictability for commercial space activities. The Outer Space Treaty applies to space objects in orbit.[135] Minimum orbital altitude is about 100 kilometers.

Not all states recognize minimum orbital altitude as the boundary of outer space. The U.N. Committee has been unable to delimit outer space. The Bogota Declaration[136] declares that the geostationary orbit (GSO) at 23,000 miles is national territory. In the absence of international agreement, delimitation by national regulation benefits space commerce. The Australian legislation specifically refers to an altitude of 100 kilometers above the surface of the Earth as the boundary of outer space. The United States legislation does not state a specific boundary between outer space and air space.

10. National regulation of Debris in Outer Space

Space debris threatens the existence and viability of commercial space. Accumulation of debris is an increasing problem. It is in the interest of the space industry to eliminate or at least reduce the proliferation of space debris. At this time it is not technologically possible to remove existing space debris; however it is possible to minimize future debris. The most effective way to minimize debris accumulation is before launch by requiring launch operators to plan to prevent debris after the launch into outer space. The most effective point at which to require such planning is when the launch permit is requested from the national government. It is in the common interest to adopt national regulation requiring debris mitigation. Fortunately, there exists voluntary international mitigation guidelines produced by an international forum, the Interagency Space Debris Coordination Committee (IADC).[137] The IADC debris guidelines can readily be implemented by national regulation.

Technology, July 17, 2006, at 170.

[135] Outer Space Treaty, *supra* n. 2, Art. IIII, prohibits placement of space objects carrying nuclear weapons or other kinds of weapons of mass destruction in orbit around the Earth.

[136] Claims by Equatorial states to property rights in the geostationary orbit (GSO).

[137] See Mirmina, *supra* n. 20.

11. Continuous Oversight of Commercial Space Activities after Launch

The Outer Space Treaty Art. VI requires the States Parties to the Treaty to exercise "continuing supervision" over activities of commercial parties in outer space. The national legislations of some states limit their application to the launch phase. The Australian legislation can also be made applicable to the de-orbit phase. U.S. legislation has also recently been amended to include the de-orbit of satellites and reusable launch vehicles. However, the commercial space laws of these two countries do not regulate space objects while in space, thus leaving a possible vacuum in national oversight. This is a serious omission because Art IV specifically requires continuing oversight. Other national laws govern space objects while they are in outer space, for example, communications laws[138] regulating the use of radiofrequencies to communicate with satellites and distribution of orbital slots. The national regulation is coordinated internationally through the International Telecommunications Union.

Increasingly, commercial operators have continuous activities in outer space. For example in 2006 a US company, Bigelow Aerospace Company, launched an inflatable spacecraft (Genesis) into outer space on a Russian launch vehicle.[139] The vehicle is in orbit at about 340 miles above the Earth. This experimental space vehicle is intended to test whether even larger inflatable space crafts, linked together in outer space, could be permanently operated as a space hotel for space tourists. Genesis will be accessed by crew transport vehicles like the Russian Soyuz. Commercial activities in outer space, in particular involving human beings in outer space, would need extensive national supervision because they could involve emergencies requiring rescue of space participants. In view of the very specific language in Art. VI of the Outer Space Treaty, requiring continual governmental supervision of private activities in outer space, it is suggested that national space legislation should include supervision of commercial activities while in outer space. Other commercial activities in outer space would require continuous oversight.

CONCLUSION

Nations that want to enjoy the economic advantages of high technology should weigh the benefits of national space legislation. The United States, Australia and the U.K. are examples of states that have developed national space legislation. Other countries having significant space commerce, for example, China, India, Indonesia and Thailand, are considering development of comprehensive national legislation for commercial space activities. Many countries are among those nations designated by the Outer Space Treaty, Art VI, as "appropriate" regulatory states and it may be time for them to consider national regulation of their commercial space operations. Ultimately, whether to adopt national space legislation depends on a state's national interests, its stage of economic and social development, its constitutional structure, and the nature of its private space activities. [140]

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[138] ITU legal instruments *supra* n. 4.

[139] Space News, July 17, 2006, at 3.

[140] Yun Zhao, *supra* n 60, at 9.

Session 3

Asia's Role in Remote Sensing and Legal Aspects of Access to High-Resolution Satellite Imagery

ASIA'S ROLE IN REMOTE SENSING AND LEGAL ASPECTS OF ACCESS TO HIGH-RESOLUTION SATELLITE IMAGERY

by

K.R. Sridhara Murthi•

1. Preamble

Over the years, space based remote sensing has been playing an increasingly important role in the Asian region, particularly through integrated use of space and information technologies as tools for decision support. This role is also strongly interconnected to and influenced by global developments in this field. With information revolution gaining greater ground every day, huge amounts of data and information flow widely across the globe and there is a growing acceptance of transparency, leading many governments to relax long held political restrictions on gathering and dissemination of information. Quite significantly satellite imagery has become a crucial component of an ongoing shift towards greater transparency. This phenomenon is no exception to Asian region.

On the other side, this information revolution is also playing a big role in economic and social development of Asian countries. However, information is like a double edged sword and it can yield highly beneficial effects as well as undesirable consequences depending on its use. There have been serious concerns in Asian countries about national security and about use of terrorism as a tool for political ends and also for destabilising economic and social infrastructure. Therefore, governments are faced with the genuine need for ensuring security and rule of law. They have a need to ensure that high quality information derived from space, which is made easily accessible by the present day technology, is used for benign purpose only. Advances in technology which made the character of information flow borderless, have also revealed inadequacies of existing law in dealing with such concerns as protection of privacy, rights to intellectual property, national security and use of space imageries exclusively for the benefit of society. Different countries have evolved different approaches to deal with such concerns arising from availability of high resolution remote sensing data or information derived from it. Often, the debate centers on the question of restricting information vis-à-vis other strategies. Lack of common international legal norms on all associated aspects compounds the problem.

2. Remote Sensing in the Asia Pacific

Asia Pacific region has been an active contributor to remote sensing satellite programs and has led many developments in this field on a global scale. There are several countries in the region with established space segment capabilities.

Following are the highlights of progress in different countries:

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2.1 China:

Notable achievements in past by China include developments and launches of recoverable remote sensing satellite series and embarking subsequently on Ziyuan Resources Satellite Series. A series of polar orbiting and geo-stationary meteorological satellite and a ocean monitoring satellite had been launched. Through the launches of CBERS 1A & 1B earth observations satellites, in collaboration with Brazil, China has established a unique model for international cooperation. Follow-on CBERS 2B, providing imagery capability of 5 meters in pan chromatic and 10 meters in multi-spectral is planned. China's further goals also include establishing ocean satellite series, resource satellite series and small satellite constellation for earth environment monitoring. China is planning to develop a small satellite constellation comprising of five satellites with optical/SAR sensors for Disaster Management applications. China has also been flying instruments such as radiometers and spectrometers on its manned vehicles. Beijing-1, which is built by Surrey Satellite Technology Ltd., will be operated commercially by Beijing Land view Mapping Information Technology Ltd., to serve government and private users

2.2 Japan:

Japan had remarkable achievements in remote sensing satellite technology. It launched two marine observation satellites (MOS-1 and 1b). The Japanese Earth Resources Satellite-1 launched in 1992 carried both optical and Synthetic Aperture Radar instruments. Advanced Earth Observation Satellite (ADEOS) of Japan carried Advanced Visible and Near Infrared Radiometers and Ocean Colour and Temperature scanners. Significantly, it was also a platform for orbiting international payloads (from CNES and NASA). ADEOS-II, which was follow-on, carried more advanced sensors enabling conduct of global monitoring of environmental changes such as circulation of water and energy. Tropical Rainfall Measuring Mission (TRMM) launched in 1997 carrying precipitation radar is yet another successful joint project of the USA and Japan. A state of the art satellite called ALOS (Advanced Land Observing Satellite) which was launched recently has been a landmark mission that will help monitor environmental changes and disasters, explore natural resources, map terrains and unveil the mysteries of the earth. It carries multiple sensors including a high resolution stereo imager as well as an L- Band Synthetic Aperture Radar. Thus, Japanese programmes in Earth Observation satellites have considerably expanded opportunities for international cooperation.

2.3 India:

Starting with the aim of meeting domestic requirements, India developed and established an impressive array of cost effective remote sensing satellite systems, under IRS series, which is serving the global community currently through a network of about 20 international ground stations. In its endeavour for global marketing of Earth Observation data, India's Antrix Corporation had an alliance with the erstwhile Space Imaging Company llc, of the USA (presently Geo Eye). India launched so far ten earth observation satellites, providing a versatile complement of optical and passive microwave sensors, and providing data up to 1 meter resolution. An operational high resolution satellite, Cartosat-2 is slated for launch this year. A satellite with an active microwave sensor (SAR) is being built to provide all weather data for applications in agriculture, disaster management and others. Indian satellites, while providing reliable supply of data through continuity of missions, constantly provided advancements that

enhanced application possibilities. A 25 year long term planning approach evolved by India underscores policy objectives, which combine public good with economic returns. They aim at leading the technology developments while providing continuity of services through an operational EO infrastructure with a constellation of satellites carrying multispectral, hyper spectral high resolution, all weather and stereo imaging sensors.

2.4 Republic of Korea:

The Korean satellite program, initiated through small satellites known as KITSATs which carried a three band CCD camera among other payloads, graduated successfully to launch in 1999 Korean Multipurpose Satellite (KOMPSAT-1), developed in partnership with TRW of USA, carrying a 6.6m panchromatic camera and a 6 band ocean colour camera. The KOMPSAT-2, ready to be launched in July 2006, carries high resolution sensors up to 1m resolution. The Korean model successfully integrates international cooperation and leapfrogging through technology transfers.

2.5 Thailand:

The first micro satellite was developed by Makanakorn University with assistance of Surrey's Satellite Technology Ltd. GISTDA, which is a leading national organisation in the field of space activities and applications has awarded a contract on Europe's EADS-Astrium in July 2004, for delivering THEOS, the first earth observation satellite of Thailand, equipped with a 2 meter resolution panchromatic camera and a multispectral sensor of 15 meter resolution. THEOS after its launch in 2007 is intended to lead Thailand to realize its goal of affordable access to space.

2.6 Other programs:

Various other countries in the region made forays into satellite technologies including remote sensing instruments and are in the process of upgrading them. The small satellites of Malaysia (Tuingsat-1 and RazakSAT, capable of acquiring medium to high resolution images), and Singapore (X-sat with 10 meter multi spectral capability) and Indonesia's LAPAN-TUBSAT (5 meter resolution) developed in collaboration with Technical University of Berlin are notable examples for such developments.

There are several conclusions one could draw through foregoing discussion relating to space segment capabilities in Asia. Firstly, the governments recognize that remote sensing space segment investments are largely public good; that the programs are driven by the motivation to achieve certain level of autonomy in access to space for meeting national needs. Parallely they also seek integration into international efforts and are promoting international cooperation. The region also supports commercial developments, particularly in dissemination of data and value addition process. The region has made notable contributions towards making data accessible at affordable costs in their domestic as well as global markets.

3. Remote Sensing Ground Segment

Another distinction of Asian region in Remote Sensing pertains to establishment of a large array of data acquisition, processing and information dissemination systems in different

countries. More than a dozen such stations are in operation now, which is unparalleled in the world. Two significant benefits of these are that (a) they serve as vehicles for international commercial systems for servicing widely spread users in different countries and (ii) they serve as infrastructure for establishing a comprehensive national satellite remote sensing application system using remote sensing data.

4. Remote Sensing Applications in the Region

Being home to a predominant number of developing nations, a wide range of innovations in the use of remote sensing data for development are found in the region. Problems associated with natural resources are common here and they are tackled with use remote sensing technology in a unique way. Location of ground water potential in villages which have poor access to water is one example. In India this application covers some 140,000 villages – where the information on potential locations for drilling for ground water is provided along with strategies to make this exploitation sustainable. Large tracts of degrading lands are located using satellite maps and their reclamation is planned. Evidence on forest encroachers or those violating coastal zone regulations are gathered and provided to courts of law and authorities enforcing regulations. Fishermen are provided with bulletins to guide them to locate large schools of fish in offshore fishing operations. Planning urban facilities, assessing environmental impacts of development projects, watershed development for agriculture, biodiversity characterization, crop yield assessment in advance of harvests, and data bases for flood damage assessments are some more typical examples of such applications.

The applications scenario has considerably expanded with the advent of commercial high resolution images from multiple sources. The major uses for such imageries, which are still expensive, are found in national security, urban mapping and certain aspects of disaster management. The potential for their use is not yet fully tapped. Diverse factors such as price, lead time for supply and data policies are found to influence their level of use.

A direct consequence of various developments in remote sensing technology and an expanding array of applications are paving the way for growth of value adding industries in geospatial information. There are several hundreds of them in the region, of varying sizes and specialisation. New possibilities unfolded by Convergence of tools and technologies related to GIS, GPS and Remote Sensing have become drivers for their growth.

These developments in technology and slowly leading to emergence of National Spatial Data Infrastructures, which interlink and integrate various databases managed by different agencies in the government and generate information that can be accessed by the users in the government and private sector including general public and NGOs. The social processes involved in such integration and the long time scales which are needed for such changes cannot be underestimated. However, availability of high-resolution remote sensing data in commercial domain has accelerated such a movement. Such a development can enhance the benefits from space based remote sensing providing greater transparency and serving public good objectives of Remote Sensing, besides providing a strong support for development of Geospatial business.

5. Legal aspects of Access to High-Resolution Satellite Imagery:

5.1 International Legal Frame work:

International legal framework for access to high resolution satellite imagery is constituted by relevant provisions of the UN treaties and conventions related to Outer Space in general and the UN resolution relating to remote sensing of the earth from space, which was adopted by UN General Assembly by consensus in 1986, in particular. These principles reiterate the freedom of imaging from space, requiring no prior consent of sensed country, irrespective of the resolution at which images are taken. At the same time they also stipulate that remote sensing activities from space shall not be conducted in a manner detrimental to the legitimate rights and interests of the sensed state. The Principles provide that as soon as the primary data and the processed data concerning territory under its jurisdiction are produced, the sensed state shall have access to them on a non-discriminatory basis and on reasonable cost terms. The sensed state shall also have access to the available analyzed information concerning the territory under its jurisdiction in the possession of any state participating in remote sensing activities on the same basis and terms, particular regard being given to the needs and interests of the developing countries.
These principles also emphasize that remote sensing activities shall be conducted on the basis of respect for the principle of full and permanent sovereignty of all states and peoples over their own wealth and natural resources, with due regard to the rights and interests, in accordance with international law, of all other states and entities under their jurisdiction.

It is to be noted that there is no preferential or exclusive right for data to the sensed state, even when the resolution of data is very high. Moreover, the principle of non-discriminative access to primary data is also interpreted and practiced differently by different operators.

The policies adopted by the commercial operators show that the sensed states do not have priority for acquisition of data over their territories if they are unable to pay the high premium which the other customers in any part of the world are ready to pay, even if those customers make such request later than the sensed state. Thus there could be tensions, particularly when a state considers that entities abroad have exploited information about its territory even as it had no fair or affordable access to the same due to commercially driven policies.

Since the data availability from commercial systems providing high resolution data will be mainly driven by the market considerations, the affordability for accessing such data will be another major issue for a large number of states, particularly for developing states.

The provisions in the UN principles applicable to states conducting remote sensing activities are to be implemented through a set of national regulations or policies. This assumes even greater significance when commercial entities in private sector conduct these activities. Other wise principles of respecting non-discrimination, ensuring access to sensed states of data over their territories, sovereign rights of states, protection of environment, timely response to disasters and assistance to developing countries could come in conflict with commercial goals and policies. As of now, policies and practices by states vary and there is need for harmonization at international level.

5.2 Legal Frameworks Adopted by Providers of High Resolution Images:

Evolution of commercial systems for high resolution data came in the new atmosphere of post-cold war era through the new legal and policy measures adopted in the USA such as Land Remote Sensing Act of 1992 and the Presidential Decision Directive of 1994, which provided framework for licensing private remote sensing satellite systems and which loosened restrictions on the sale of imageries to foreign entities. Several private companies in the USA were granted licenses by the US government for establishing and operating commercial remote sensing systems. The commercial systems licensed by USA played a predominant role in global availability of high resolution data of one meter class. This is progressed further with others too joining this trend. Commercial systems in high resolution domain today are as follows:

Space Imaging's IKONOS (presently operated by Geo Eye, USA) providing images at 1 meter resolution, Digital Globe's (USA) Quick bird 2 providing images of 0.8m resolution, Orb view 3 (of ORBIMAGE, USA) providing 1 meter resolution images, EROS A1 of Israel providing 1.8 m and EROS B (0.8 m resolution), SPOT-5 of France providing 2.5 m images, India's Cartosat-1 and Japan's ALOS both providing stereo images of 2.5 meter resolution.

In July 2000, the National Oceanographic and Atmospheric Administration (NOAA) of the US Department of Commerce issued new interim final regulations relating to the licencing of private land remote sensing space systems, which provide for the requirements for licencing, monitoring and obligations of operators of private earth remote sensing satellite systems. They also specify provisions for promoting collection and availability of satellite imagery having regard to the national security interests, foreign policy and international obligations of the US. These regulations reiterate requirements for specific license for operating private remote sensing system and the requirements on licensees to maintain operational control of the satellite from a location in the US at all times. The licencee could also be required by the US Government to limit data collection and/or distribution as determined by significant national security or foreign policy concerns or international obligations of the US.

Although the US Land Remote sensing Policy Act of 1992 incorporated the principle of non-discriminatory access to unenhanced data by the sensed state, as soon as such data are available and on reasonable terms and conditions, subsequent regulations of 2000 provides that the US licensees will be obligated to follow the above principle only in cases where the US government financially supported their satellite system. In such cases, the US government reserved the right to limit such non discriminatory access. In cases where satellite system has been funded by private services, the freedom is given to licencee to provide access to its un enhanced data in accordance with reasonable commercial terms and conditions, subject to the requirement of providing data to the government of any sensed state. Therefore under the US law, the sensed state may have access to un-enhanced data, but non-discriminatory access may be allowed only subject to the US national security concerns, foreign policy interests or international obligations. Such covents for non-discriminatory access on the grounds of national security interests or other interests of sensing states or private entities under their jurisdiction may well become a norm internationally as the number of sensing states increase. More over, as the distinction between commercial remote sensing system and military systems are fading away fast, current policy will gather even greater strength. One cannot ignore that exclusive possession of data for military/security uses has been one of the major drivers of success of high resolution imagery in the global market.

On the other side, sustainability of high resolution systems in commercial domain depended on the *anchor tenancy* role of government, particularly in the USA. In future too this may continue. A strong indicator for this is the Commercial Remote sensing Policy, which is released by the Us Administration on 25 April 2003 and this policy aims to rely to the maximum possible extent on the US commercial imaging capability for fulfilling the imagery and geo-spatial needs of government users. Towards this the said policy allows (a) greater reliance on commercial remote sensing for meeting US national security and foreign policy needs, (b) incentives for improving commercial imaging capabilities, (c) building stronger partnerships between civil agencies and industry and (d) reducing uncertainties for foreign access to US commercial remote sensing capabilities. The implications of this policy to Asia are that there will be better sustainability for maintaining multiple sources and competitive environment for high resolution data and secondly, there will be greater scope for Asian satellite operation to tie-up with American industry. However, extent to which cooperation in market access and technology cooperation between the US and Asian countries could progress will be conditioned by stated objectives of the US policy of maintaining US leadership in remote sensing space activities and meeting its national security and foreign policy interests and the policies of individual countries in Asia. In any case, the technology advances, taking place in Asian region and greater competition are likely to lower data prices in a substantial way for 1 meter class of imageries.

5.3 Legal aspects in the user environment.

There are two ways in which the users could have access to high resolution data in their countries. One is by direct access to satellites through ground stations and processing systems, supplied as proprietary systems by the satellite operator. The second channel is through the supply by the satellite operator who records and downlinks data in his own stations and supplies to users after processing the data, through commercial distribution channels. In case of direct access to US licensed satellites, current regulations require specific licence by the US government for the export and operation of ground station systems in foreign territories. Normally such systems are not amenable for modifications or augmentation by the user to receive data from other satellites. Through either of above two approaches, countries in the Asian region have been accessing high resolution data from commercial satellites licensed by the US. Contrary to the serious concerns expressed in various *fora*, regulatory and the policy tools adopted by the US particularly relating to data access (for example 'shulter control') have not adversely affected their widespread use and beneficial applications in the developed as well as developing countries. Data from IKONOS, Digital Globe and Orbview have been commercially made available to distributors in Asian countries including China, Japan, India, Malaysia, Thailand, Singapore, Indonesia, the Philippines, Republic of Korea and so on.

Policies on availability of data to private entities in each country have however been varying depending on the perception of security concerns involved. Private entities in Asian countries are permitted to access such data freely or with some restriction such data for commercial/business uses such as mapping, generation of geospatial information/data bases and so on. Map distribution policies in Asian region are still undergoing transformation, taking into account new capabilities and realities of digital age. Laws are being enacted giving the public the right to information. Open and Free availability of digital maps upto reasonably finer scale and removal of restrictions for value additions are key to the growth of commercial sector. One of the CEOs of emerging Geo Spatial Information Company in the region recently expressed in a business round table that "Information brought into the open creates greater demand, while that

which is in a locker kills the business." As regards to safeguarding security concerns, commercial entities could be required by regulations maintain register of the identities of customers and users downstream. As awareness of beneficial uses of high resolution imagery builds up, there will be greater thrust towards free and unfettered access to high resolution imageries in the public domain, the hallmark of greater transparency. Users too will not be averse to reasonable precautions against misuse of such imageries, provided such precautions cause no unreasonable delays and uncertainties.

6. Conclusions

An effective solution to the predicaments brought about by the technology developments including convergence of various disciplines give rise to issues that would warrant a harmonised international framework of legal norms urgently under an appropriate multilateral forum (such as UNCOPOUS) for addressing various concerns on access to data, its use, rights of privacy, security and sovereignty of states. It is clear that the world is currently facing far more new challenges, which were not anticipated at the time of evolution of Remote Sensing principles by the UN and an urgent debate on the issues raised is essential to utilize full potential of the high resolution images made available through space based remote sensing.

COMMENTS ON

K R S MURTHI'S DISCUSSION PAPER ON "ASIA'S ROLE IN REMOTE SENSING AND LEGAL ASPECTS OF ACCESS TO HIGH-RESOLUTION SATELLITE IMAGERY"

by

Ram Jakhu[**]

A. Introduction

In my view, Mr. Murthi's Paper provides excellent overview of the regional remote sensing systems, their benefits to various countries and the progress that is being made in further developing applications for economic development of and disaster management in the Asian region. Mr. Murthi's assertions about the Asian remote sensing policies, efforts and activities are quite interesting and valid; i.e. the Asian governments believe that the public spending for remote sensing activities is "largely public good", they are trying to achieve "autonomy in access to space" and promote "international cooperation" as the same time, and they support the commercialization of data dissemination and value-added applications.

The second part of Mr. Murthi's Paper addresses certain legal issues relating to remote sensing activities. He correctly points out that "information is like a double edged sword and it can yield highly beneficial effects as well as undesirable consequences depending on its use" and that Asian countries face serious challenges in their "genuine need for ensuring security" and the need for "easily accessible high quality information derived from space" for their economic and social development and infrastructure. It is in that regard that I would like to add a few brief comments; specifically relating to (i) access to remote sensing data and (ii) distribution of sensitive data by private companies like Google.

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B. Access to remote sensing data

Mr. Murthi referred to the application and importance of the 1986 UN Principles Relating to Remote Sensing of the Earth from Outer Space.[1] He correctly points out that the Resolution provides "no preferential or exclusive right for data to the sensed state." However, it must be kept in mind that a sensed State has been entitled to right of access to the primary data, the processed data and the analyzed information on a non-discriminatory basis and on reasonable cost terms. During the negotiations on the Resolution in the Legal Sub-Committee of the UN Committee on Peaceful Uses of Outer Space, this right for the sensed States was gained only as a result of a compromise when a large majority of COPUOS member States (comprising of developing, socialist and several Western countries) gave their demand for the requirement of their consent by the sensing States before starting the collection and distribution of remote sensing data.[2] For several years, this right has been respected but since 1997 several

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[1] UN General Assembly, Res. 41/65, U.N. GAOR, 41st Sess. 95th plen. mtg., princ. I. (a), U.N. Doc. A/RES/41/65 (adopted without vote on 3 December 1986).

[2] For details, see Ram Jakhu, "International Law Regarding the Acquisition and Dissemination of Satellite Imagery",

(sensing) States have been imposing limitations on the non-discriminatory access to remote sensing data. At the request of Israel, the US decided by adopting a law in 1997, not to allow any American satellite operator to collect or distribute a certain type of satellite imagery of Israel's territory.[3] In 2000, the National Oceanic and Atmospheric Administration (NOAA) of the US Department of Commerce, under the Land Remote Sensing Policy Act of 1992,[4] issued interim Regulations relating to the "Licensing of Private Land Remote-Sensing Space Systems."[5] The Final version of these Regulations has been issued by NOAA on April 25, 2006.[6] The Regulations though recognized a sensed State's right of access to remote sensing data and information on a non-discriminatory basis, yet significantly compromised and restricted this right by subjecting it to national security or foreign policy interests or international obligations of the United States. Other States have also started following the lead taken by the US; thus are not only acting contrary to the previsions of the 1986 UN Resolution but also could restrict the availability of the satellite remote sensing data and consequently limit the benefits of this important space application.[7] This development warrants a new international treaty that could be built upon the main provisions of the 1986 UN Resolution. It should provide a fair balance of interests of the sensing and sensed States, and be conducive to the interests of the private sector involved in the commercialization of remote sensing products and service and thus expanding their benefits to all.

C. Distribution of Sensitive Data by Private Companies like Google Earth

Google, an online search engine operator, by using satellite images started providing data service under its brand name 'Google Earth', by accessing to which any Internet user may zoom in to buildings, bridges, militarily installations and facilities, other sensitive and strategic sites etc. This kind of service raised personal privacy and national security concerns.[8] Countries like France, India, Israel, Russia, South Korea, expressed strongly that their national security is being compromised by Google Earth. The President of India, an acclaimed space scientist, said that geographic details provided by Google Earth's satellite images create security risk and the developing "countries, which are already in danger of terrorist attacks, have been singularly

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Vol. 29, *Journal of Space Law*, 2003, pp. 65 et seq.

[3] National Defense Authorization Act for Fiscal Year 1997, S. Rep. No. 104-278, 104th Cong., 2nd Sess. (1996). Authorizing appropriations For Fiscal Year 1997 For Military Activities of the Department of Defense, For Military Construction, And For Defense Activities of the Department of Energy, To Prescribe Personnel Strengths For Such Fiscal Year For The Armed Forces, And For Other Purposes: PROHIBITION ON COLLECTION AND RELEASE OF DETAILED SATELLITE IMAGERY RELATING TO ISRAEL AND OTHER COUNTRIES AND AREAS.

[4] Land Remote Sensing Policy Act of Oct. 28, 1992, Sec. 202 (b) (2), Pub. L. No.102-555, 15 U.S.C. § 5601-5672, 106 Stat. 4163.

[5] US Department of Commerce, National Oceanic and Atmospheric Administration, 15 C.F.R. Part 960 (Docket No.: 951031259-9279-03) RIN 0648-AC64 (current through May 26, 2003, 68 FR 28646).

[6] US Department of Commerce, National Oceanic and Atmospheric Administration, *Licensing of Private Land Remote-Sensing Space Systems; Final Rule*, 15 CFR Part 960.

[7] For details, see Ram Jakhu, "Legal Issues Relating to the Global Public Interest in Outer Space", Vol. 31, *Journal of Space Law*, 2006, page 32, at 78 *et seq.*

[8] Katie Hafner and Saritha Rai, "Google Earth: Too close for comfort?", The New York Times, Tuesday, December 20, 2005, http://www.iht.com/articles/2005/12/15/business/image.php (accessed on: 25-May-06); Katie Hafner, Saritha Rai, New York Times, "Google Earth asked to back off Some nations fear free up-close photos jeopardize sensitive sites", Tuesday, December 20, 2005, http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2005/12/20/MNGD8GALOR1.DTL (accessed on: 19-Jan-06); Elizabeth Svoboda, "Google's open skies raise cries", December 01, 2005, http://www.christiansciencemonitor.com/2005/1201/p13s01-stct.html (accessed on: 19-Jan-06)

chosen."[9] An analyst for the Russian Federal Security Service has been reported stating that "Terrorists don't need to reconnoiter their target. Now an American company is working for them."[10] On the other hand, the Australian government has been of the view that Google Earth does not pose any security threat. A spokesperson for the Australian Attorney-General has been reported to have said, "If we were to receive advice from our security agencies that there were concerns, then the Government would take the appropriate action."[11] However, being concerned about security of its nuclear installations the Australian Nuclear Science and Technology Organization had asked Google to consider censoring sensitive information.[12]

What could the States that feel threatened from Google Earth's services do to protect their security? I think that there are not much precise options available to these States. However, they may raise their concerns with the government having jurisdiction over Google Earth; i.e. the US. In this regard, it may be noted that there exists a general and well-recognized principle of international law, as articulated in *Trail Smelter Arbitration*; i.e. "State owes at all time a duty to protect other States against injurious acts by individual from within its jurisdiction."[13] This legal principle might be considered to support and provide legal basis and justification for asking the redress of the concerns by the aggrieved countries.

Secondly, the aggrieved States may also ask Google management to limit the resolution of imagery of sensitive sites or delete damaging information. There is no doubt a risk that a private company can be obliged to halt its service. However, no private or public domestic or foreign entity can or should be allowed to compromise a nation's security. I believe that Google as any other commercial enterprise would not like to see a country restricting its use, and thus should be willing to comply with genuine request from a State. The governments of France, India, Israel and other countries have rightly appealed to Google to limit access to some images and Google has rightly complied.[14]

Finally, in extreme cases, when neither the host government of Google nor Google itself is willing to take any effective action to ensure the security of a State, that State may block the availability of Google Earth through the Internet in its territory. A government's action to stop the availability on its territory of information that threatens its security will be a justified decision in the exercise of its sovereignty[15] since the issue of national security is of paramount importance.

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[9] Dinesh C. Sharma, "Indian president warns against Google Earth", CNET News.com, October 17, 2005, http://news.com.com/Indian+president+warns+against+Google+Earth/2100-1028_3-5896888.html?tag=nefd.top (accessed on: 19-Jan-06).

[10] Katie Hafner and Saritha Rai, "Governments Tremble at Google's Bird's-Eye View", December 20, 2005, http://ethics.tamucc.edu/article.pl?sid=05/12/20/227246 (accessed on: 19-Jan-06).

[11] "Google Earth and Security", December 26th, 2005, http://security.srijith.net/2005/12/26/google-earth-and-security/ (accessed on: 19-Jan-06).

[12] "Google Earth poses no risk, Government says", August 8, 2005, http://www.smh.com.au/news/technology/google-earth-poses-no-risk-government-says/2005/08/08/1123353256404.html (accessed on: 19-Jan-06).

[13] *Trail Smelter Arbitration* (1949), 3 R Int'l Arb. Awards 1965-1966. In addition, it is also interesting to note an other pertinent rule of international law, as recognized Judgment y the International Court of Justice in the Corfu Channel (The United Kingdom v. Albania); i.e. every State is under an "obligation not to allow knowingly its territory to be used for acts contrary to the rights of other States." I.C.J. Reports 1949, p. 22.

[14] "Google Agrees to Limit Resolution of Israel Satellite Photos", Dec 25, 05, http://www.israelnn.com/news.php3?id=95437 (accessed on: 19-Jan-06)

[15] A customary rule of international law that recognizes "the sovereign right of each State to regulate its telecommunication" has been reiterated in the Preamble of the Constitution and Convention of the International

It is not unexpected that Sates would take such actions, when they feel it is imperative to do so in order to protect their security interests.

States should respect the legal norms supporting freedom of information,[16] but such freedom is not absolute. I believe that States should allow the use by Google Earth and other research engine operators all satellite remote sensing data that does not threaten their national interests or the interests of other nations. In practical terms, I think anything above 5 meters resolution should be allowed freely to be shared as long as it is not real-time data but is two or three years old. In fact, Google doesn't use real time data and it shouldn't.

D. Finally:

Mr. Murthi aptly concludes his Paper with a recommendation emphasizing the necessity of "a harmonized international framework of legal norms urgently under an appropriate multilateral forum (such as UNCOPOUS) for addressing various concerns on access to data, its use, rights of privacy, security and sovereignty of states." Unfortunately, the international discussions on the subject of remote sensing have taken away from the UNCOPUOS and have shifted to the Committee of Earth Observation Satellite (CEOS), a body whose membership is limited to governmental agencies of the sensing States.[17] It is obvious that the interests of the sensed States and the users of the remote sensing products and services might not be possibly fully protected under the decisions by CEOS.

Telecommunication Union (1994, as amended in 1998, 2002 and 2006).

[16] Article 19 of the 1948 Universal Declaration of Human Rights (G.A. res. 217A (III), U.N. Doc A/810 at 71) recognized that "Everyone has the right to freedom of opinion and expression; this right includes freedom to hold opinions without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers."

[17] For details, visit http://www.ceos.org/.

COMMENT ON THE DISCUSSION PAPER ON ASIA'S ROLE IN REMOTE SENSING AND LEGAL ASPECTS OF ACCESS TO HIGH-RESOLUTION SATELLITE IMAGERY PRESENTED BY MR. K. SRIDHARA MURTHI

by

Prof. Sergio Marchisio[*]

In his remarkable Discussion Paper on "Asia's Role in Remote Sensing and Legal Aspects of Access to High-Resolution Satellite Imagery", the Author presents a twofold picture of the issues at stake.

In the first part, he underlines that quite significantly satellite imagery has become a crucial component of an ongoing shift towards greater transparency in Asia Pacific as well as all over the world. In fact, he shows how the Asia Pacific region has been an active contributor to remote sensing satellite programs and has led many developments in this field on a global scale. The main point to be stressed is, from my point of view, that the region has made notable contributions towards making data accessible at affordable costs in their domestic as well as global markets, as well as to establish a large array of data acquisition, processing and information dissemination systems in different countries. It is true that this development seems unparalleled in the world.

At the same time, a wide range of innovations in the use of remote sensing data for development are found in the region. The applications scenario has considerably expanded with the advent of commercial high resolution images from multiple sources. The major uses for such imageries, which are still expensive, are found in national security, urban mapping and certain aspects of disaster management. The social processes involved in such integration and the long time scales which are needed for such changes cannot be underestimated. However, availability of high-resolution remote sensing data in commercial domain has accelerated such a movement. I do agree that such a development can enhance the benefits from space based remote sensing providing greater transparency and serving public good objectives of Remote Sensing, besides providing a strong support for development of Geospatial business.

The second part of his discussion paper deals with the legal aspects of access to high-resolution satellite imagery, starting from the premise that there have been serious concerns in Asian countries about national security. Therefore, governments are faced with the need for ensuring at the same time security and rule of law. Different countries have evolved different approaches to deal with such concerns arising from availability of high resolution remote sensing data or information derived from it. Often, the debate centers on the question of restricting information vis-à-vis other strategies. The main assumption by the Author is that lack of common international legal norms on all associated aspects compounds the problem.

Against this background, I think that the relevance of the international discipline of remote sensing activities can easily be understood. Indeed, important questions are how and to what extent commercial aspects have influenced the legal regime of remote sensing. One

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wonders if, as a consequence of new and highly sophisticated technologies and the proliferation of remote sensing operators, the juridical regime established by the UN Principles has become obsolete or insufficient to regulate all aspects of these space activities. The question then becomes whether, and how, private actors in their contracts can apply the international standards and rules, together with national legislation recognizing them.

In fact, at the universal level, the international legal framework for access to high resolution satellite imagery is still constituted by the relevant provisions of the UN treaties related to Outer Space in general and by Resolution 41/65, of 3 December 1986, Principles Relating to Remote Sensing of the Earth from Outer Space in particular.

Leaving aside for the moment the consideration of the formal act through which they were adopted, in my view, the decisive element in assessing the legal value of the 1986 Principles comes, perhaps mostly, from outside the adoption of the resolution. It comes from the practice of States prior to, concomitant with and following the UN-recommendation process. The ongoing and emerging developments in the practice and national legislation concerning remote sensing suggest, on the one hand, the need to inquire whether the whole UN code has stood the test of time, especially given the advent of a new generation of remote sensing technologies. On the other hand, these developments show a trend in establishing exceptions and limitations whose implications on the consolidated character of some principles are to be examined and assessed.

I would like to stress immediately that, up till now, it could be misleading to evaluate the Principles as a perfect whole. We can assume, in fact, that their legal status is fairly variable. Some of them in fact seem more firmly established in international customary law (like the freedom of earth's observation from space or the right of permanent sovereignty over natural resources), while others (think of the co-operation and information Principles) seem to be less consolidated, and still in the process of gaining complete legal relevance. In fact, the Principles belonging to the second category are procedural rather than substantive rules, as compared to those in the first category, and vice versa.

Therefore, as already stressed, for the purpose of legal qualification of the 1986 Principles, it is preferable to assess the legal weight of each set of similar or analogous provisions, taking into account the relevant practice of States according to the rules of international law governing activities in outer space, and, foremost, to the 1967 Outer Space Treaty (OST) . These considerations are prerequisites for other, more specific conclusions.

I believe that practice of States seems to have confirmed the general and main aspects of the legal regime set forth in 1986 by the Principles. I refer, first, to the scope of application of the Principles, as set out in the Definitions. According to those definitions, "remote sensing" does not embrace all types of observation of the earth or all analyses of the phenomena observed and data collected. In fact, it covers those activities performed for the purpose of improving natural resources management, land use and the protection of the environment. From this point of view, the international regime of remote sensing inherently aims at realizing what I call sustainable development-oriented objectives, rather than at other aims. Military activities would fall outside their scope of application, and would be subject to special legal regimes established in international treaties, especially those relating to disarmament and arms control. Moreover, the identification of these three specific purposes also suggests the inapplicability of the Principles to other civilian activities clearly undertaken to different ends.

In this respect, it is true that some problems could be raised by recent State practice of system mergers, combining civilian and military remote sensing programs, such as that foreseen by the U.S. Presidential Directive of 5 May 1994, which established the fusion of civilian and military programs of meteorological satellites in the polar orbit, including missions of environmental surveillance. In this case, the guiding principles applied to convergence are the recognized importance of operational environmental data and assured data access, with the possibility of selectively denying critical environmental data during political crisis or conflicts for security reasons.

Let us consider now the definitions contained in the General Assembly Declaration. Principle I(a) defines "remote sensing" only as the sensing of the earth's surface from space. Principle I(e), however, extends the scope of application of some of the Principles beyond outer space, by including in the concept of "remote sensing activities" a wider range of operations on earth: "the operation of…primary data collection and storage stations, and activities in processing, interpreting and disseminating the processed data". In this connection, therefore, the 1986 Principles distinguish three types of information, namely primary data", processed data and analyzed information.

The distinction drawn in Principles I(a) and I(e) between "remote sensing" and "remote sensing activities" could seem a mere formality, but it is not. I shall try to demonstrate this in dealing with Principle XIV, which provides for a two-fold system of responsibility covering both of these types of remote sensing.

According to the first part of Principle XIV, States operating remote sensing satellites shall bear international responsibility for their activities and assure that such activities are conducted in accordance with the Principles and with norms of international law, irrespective of whether such activities are carried out by governmental or non-governmental entities or through international organizations to which those States are parties. This literally restates Article VI of the 1967 OST. This special regime is applicable to remote sensing operations taking place in outer space. Remote sensing by private companies are normally subject to licensing systems established by domestic legislation, in conformity with Article VI of the Outer Space Treaty, which expressly set forth the obligation of each State to control and supervise activities carried out by private entities, as part of the national activities for which it is directly responsible. Up to this point, there is nothing new in comparison with international space law.

The problem arises in the second part of Principle XIV, following which the foregoing principle is without prejudice to the applicability of the norms of international law on State responsibility for "remote sensing activities", that is, to activities carried out also on earth. I think that this proviso states that the rules of customary international law on State responsibility, to which the International Law Commission (ILC) Draft Articles on State Responsibility adopted in 2001 refer, apply to the broader remote sensing activities taking place on earth. This means two things: that we are concerned with a regime of responsibility for breach of an international obligation of a State; and that, in order to be attributable to a State, the wrongful act must be committed by State organs, namely persons acting officially on behalf of a State .

Against this background, "remote sensing activities" carried out by private entities on earth arguably are a form of conduct 'directed or controlled by the State, and as such attributable to the State concerned. In this sense, we can assume that, while a remote sensing State's absolute

responsibility for private national activities in outer space is subjected to the special regime set forth in Articles VI and VII of the 1967 OST and the 1972 Liability Convention, State responsibility for wrongful acts can originate from remote sensing by national, private activities carried out on earth. This conclusion is self-evident, because space law does not apply to activities on earth (where international law at large applies) and is confirmed, among other sources, by applicable national legislation.

Apart from this specific aspect, I would say that some of the 1986 UN Principles are reiterations of written or unwritten rules of international law; in this case, these provisions will be considered as binding inasmuch as they restate a customary or treaty rule, thus possessing the same rank as the latter. As to restatements of existing treaty rules, let me first quote the general rule contained in Principle III: "Remote sensing activities shall be conducted in accordance with international law, including the Charter of the United Nations, 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 the relevant instruments of the International Telecommunication Union".

In the same vein, Principle IV specifically refers to Article I of the OST, reiterating the principles of the common benefit in - and freedom of - the exploration and use of outer space on the basis of equality, already stated in Principle II. At the root of the concept of the common benefit, there is a recognition of the international community's legitimate interest in this issue, which, by its nature, affects the community as a whole. This is also true for Principle IV, pertaining to the full and permanent sovereignty of all States and peoples over their wealth and natural resources, and to the protection of the legitimate rights and interests of the sensed State. Other provisions of the Principles, whose content did not tally originally with an exiting treaty or customary rule, have been subsequently endorsed in relevant international agreement, and are progressively establishing themselves in the international practice. I note Principle II, which provides that remote sensing activities shall be carried out for the benefit and in the interests of all countries, but taking into account the particular needs of developing countries. According to this principle, remote sensing services must be performed without any kind of restriction, in the sense that they must be open to the benefit of all people and countries of the earth irrespective of their degree of economic, social, cultural and technological development. The special mention of developing countries, in particular the least developed and those most environmentally vulnerable, finds its elaboration in the ethic of global partnership and in the principle of common but differentiated responsibilities.

I come now to the principles dealing with environmental information and transfer of data. A general requirement enshrined in Principle IX sets forth sensing States' obligation, the greatest extent practicable, to make the resulting information available. The following Principles, X and XI, relate to environmental harm: the first imposes upon those States that participate in remote sensing activities, and that have identified information in their possession capable of averting any phenomenon harmful to the earth's natural environment, the obligation to disclose such information to States concerned; the second requires prompt transmission to the affected States of collected data and information relating to natural disasters.

The two dispositions show various differences concerning the kind of information and/or data to be "disclosed" or "transmitted". As for the distinction between disclosure and transmission, we understand that the latter, referring to natural disasters, implies rapid action, confirmed in the

text by the phrase "as promptly as possible", meaning without delay and by the most expeditious means available. Principles X and XI therefore appear complementary and unified by the fact that no mention is made of any conditions, such as non-discrimination or reasonable costs. These conditions are envisaged, on the contrary, in Principle XII for access to remote sensing data by the sensed State. Moreover, Principles X and XI clearly indicate that the States to be informed are not only the sensed States, but, more generally, all States concerned. Information promoting environmental protection is thereby given a different status vis-à-vis access to the data regime set forth in Principle XII.

It is probably more correct to identify the environmental regime on disclosure of data as the general regime, and to regard the Principle XII regime as a special one. Indeed, promoting the protection of the earth's natural environment (Principle X) and humankind from natural disasters (Principle XI) are typical and general objectives of remote sensing of the earth's surface from space, i.e., improving natural resources management, land use and the protection of the environment.

These principles have been increasingly and more consistently applied. Think of the preparation of hazard-related and risk-related maps. Moreover, they certainly have been highly influenced by the evolution of other branches of international law, international environmental law above all. Many environmental treaties, in fact, obligate States to notify and inform neighbouring and potentially affected States of activities that may have a significant adverse trans-boundary environmental effect. Other treaties require immediate notification of other States of any environmental disasters or similar emergencies that are likely to produce sudden harmful effects on their environment.

There are, of course, differences between, on the one hand, the transmission of remote sensing data and information according to Principles X and XI of the UN remote sensing Principles and, on the other hand, the notification requirements established by some international environmental instruments: while the former establish an obligation of disclosure and transmission of information and data on harmful phenomena or natural disasters, irrespective to the lieu of origin of the harm or of the disaster, the latter, modelled on Principles 18 and 19 of the 1992 UN Rio Declaration on Environment and Development, set out the obligation of notification of emergencies and natural disasters incumbent upon any State within whose jurisdiction or control the natural disaster or emergency or harmful activities occur.

At the very heart of the legal regime established by the Principles, we find Principle XII, concerning non-discriminatory access to data. In dealing with this aspect, we must recall that, during the process of negotiation of the 1986 Principles, the freedom of carrying out remote sensing activities was accepted in return for access to information: the two principles therefore have been inseparably linked in the 1986 package deal, and, as such, bear an inextinguishable value. This is why Principle XII recognizes the right of access of sensed States to any primary or processed data on non-discriminatory basis and at reasonable cost.

No problems arise, then, as to first part of the Principle, concerning the right of access of sensed States to any primary or processed data "on non-discriminatory basis and on reasonable cost terms" . It is not an obligation for the free or mutual exchange of data, nor does it exclude their commercialization: making data available is not to be equated with giving data away for free. The licensee is permitted to seek "reasonable terms and conditions" for its data, which implies market rates. The provision prohibits a company from entering into an exclusive contract that requires

withholding data from a sensed State, and it implies that data must be sold to every subject requesting them at the same price. The sensing operator therefore can sell the data at least twice, once to the customer and again to the sensed State.

In the second part, the obligation to disclose to a sensed State the available analyzed information concerning the territory under its jurisdiction is twice conditioned: first, to the possession of information by States (not private entities) participating in remote sensing activities; and second, the duty is subject to the availability of the information, it being clear that the two concepts of "possession" and "availability" are not equivalent. In fact, availability can depend on further conditional factors. In any case, to be consistent with this core Principle, commercialization arguably must not hinder the sensed States' right of access, and States are expected to ensure that private remote sensing entities comply with the principle of open and non-discriminatory access to data.

Having given great relevance to practice, I note that this latter practice is the field in which the behaviour of States and international organizations seems really consistent with the UN Principles. The US legislation has incorporated this principle of non-discriminatory access in both the Land Remote Sensing Acts of 1984 and 1992, as amended by the Commercial Space Act of 1998. These laws require private entities operating remote sensing activities to abide by the standard of non-discriminatory access, aimed at maintaining the public-good aspects of remote sensing.

Other countries have followed this general tendency. The French interdepartmental report of April 1995 on distribution policy for space-based earth observation reaffirms the 1986 Principles as regards non-discriminatory access to data, while recalling that they are not contrary to the idea of a return on investment. The distribution of data of the private commercial company SPOT Image must be carried out without discrimination, according to the UN Principles, but on commercial basis. Accordingly, the products are sold at market prices. Some special conditions, however, are applied to the distribution of data for research purposes, according to which remote sensing data are given to the scientific community free of charge or at reproduction cost.

Practice in this field is not limited to national legislation: other important pieces of practice come from international space organizations, as major actors in the international space law field. The official policies of the European Space Agency (ESA) concerning ERS/ENVISAT distribution of data (respectively of 1994 and 1998) are unequivocal: "The Agency will take care not to impose measures contrary to the principle of non-discrimination access to data (in particular, by the State observed), or to adopt measures that might appear to restrict international competition".

In addition, a number of international agreements and private law contracts have endorsed the UN Principles. For the latter, I can mention the contracts that EOSAT entered into with national ground stations around the world, which provide these stations with a non-exclusive license to receive and use data for a basic access fee. Similar clauses have been included in multilateral agreements concluded by national space agencies: the preambles of several of such agreements contain explicit recognition of the "Principles governing the exploration and use of outer space defined by the United Nations treaties and the principles adopted by the General Assembly relating to the remote sensing of the Earth from space".

To date, the lasting soundness of the core tenets of the 1986 UN code has been proved. But we can wonder if the code can stand the trend, developing among the major remote sensing

States toward the establishment of restrictions on the collection and release of sensed data arising from potential threats to national security and stemming from the release of detailed imagery obtained through the new technological generation of high resolution remote sensing systems. The new commercial and civilian earth-observation satellites are capable of collecting images at much higher resolutions (1-m or better), and other advanced technologies are emerging on the market, such as synthetic aperture radar and multi- and hyper-spectral imaging, which expand the utility of remote sensing applications, blurring the traditional distinction between civilian remote sensing satellites and military reconnaissance satellites, and which pose particular licensing and operational control issues for policymakers.

Although international access to a large number of observation satellites using various types of imaging sensors will substantially enhance global transparency and help resolve international crises, such as territorial disputes, there is also a risk that aggressive States or terrorist groups could exploit this emerging dual-purpose information technology for harmful purposes – a risk that the current wave of transnational terrorism has dramatically highlighted. Considering that the quality of data made available by the new techniques will be useful for security and military aims and for control of human activities as well as for the observation of the earth's surface with environmental protection purposes, the problem arises as to the relevance and suitability of the legal regime established by the UN for remote sensing carried out through high-resolution systems. Indeed, the answer is not easy.

It is true that the 1986 UN Principles might appear insufficient, in the light of the above-mentioned developments, to provide guidelines for commercialisation of remote sensing imagery policies. The Principles have not been updated to reflect the evolution of data-collection and data-processing techniques and the growing need to limit the military utility of high-resolution commercial satellite imagery and avoid their falling into the wrong hands. One way is to achieve this goal would be to impose technological restrictions, such as limiting the resolution allowed for a country's commercial or civilian imaging satellite systems, to make the data less useful for military users. Some authors contend that satellites equipped with sensors having a space resolution higher than 10 m should be expressly left out of the field of application of the whole discipline. But this seems a rather draconian solution, which would neglect the recognized usefulness of high-resolution imagery for environmental and land-use purposes, and run contrary to the relevant international discipline.

Alternatively, governments could impose operational constraints like shutter controls on any earth observation satellites under their jurisdiction for use during crises or military conflicts. In such cases, governments could temporarily limit the collection or distribution of high resolution satellite imagery of a particular territory if a conflict is imminent or ongoing. In the United States, the 1992 Land Remote Sensing Policy Act set forth provisions for licensing commercial earth-observation satellites: these licenses permit U.S. firms to sell high-resolution satellite imagery and to seek government approval for selling remote sensing technologies to foreign buyers. The U.S. Government, however, uses administrative measures to prevent U.S. commercial earth-observation satellite companies from collecting or selling imagery because of military or foreign policy. Presidential Decision Directive 23 (PDD 23) of 10 March 1994, containing the current Executive-branch policy toward remote sensing, stipulates that, when commercial remote sensing may compromise national security or international obligations/foreign policies (defined by the Secretaries of Defense or State, respectively), the Secretary of Commerce may require the licensee to limit data collection and distribution by the system to the extent required by the situation.

We can understand that recent developments have given rise to security concerns regarding our open societies, which could of course impose further prohibitions on the collection and release of satellite imagery. While the trend towards greater transparency appears inexorable, national governments foster practices that can significantly affect the pace of this trend. Such practices have to be carefully assessed, given that data availability is an integral part of the principle of non-discriminatory access, without which the principle would be meaningless.

At the same time, however, restrictions reflecting security concerns cannot be seen as contrary ipso facto to the UN Principles on remote sensing. In fact, every legal system allows limitations to the openness of information for emergency reasons; moreover, as we have seen, the existence of such restrictions does not affect the general recognition and acceptance of the principle of access to data by sensed States as the general rule: on the contrary, it is based on this very assumption.

In the end, it seems to me that, even a cursory look at the practice of States and international organizations shows a situation in which the core tenets enshrined in the UN Principles have gained and maintained their importance, even in a commercialized remote sensing system of services. Indeed, the Principles appear relevant to the expansion of these very services, and have been consistently reaffirmed. The basic international regime of remote sensing is recognized and must be preserved, promoting the broadest possible data use.

On the other hand, it is true that some of the most prominent issues connected to recent and ongoing developments in the field of high resolution remote sensing, mainly commercialization and technological innovations, are not fully regulated by the UN code. The Principles do not provide clear and specific regulation for new issues, like the legal protection of data, which is increasingly necessary to promote the costly investments required by remote sensing activities and the expansion of the related market. Nor do they provide an adequate discipline as regards the production, use and treatment of highly sophisticated and detailed imagery, especially in relation to their potential implications for national security and individual privacy.

As we have seen, however, the practice of commercial and military limitations is always accompanied by the formal reassertion of the basic principles of openness and non-discriminatory access to data. For this reason, the risk that such measures may weaken the 1986 code, and inhibit the expansion of remote sensing services, is limited by the fact that they are clearly intended as mere exceptions, required in order to face newly arisen situations, and are not perceived as having undermined or modified its value. In this vein, the above-mentioned measures might correctly be classified as integrating regulations and practices, adopted within, and in conformity with, the sound framework provided by the 1986 Principles.

Admittedly, by the time that most of the Principles were agreed to, they confirmed either existing practices or some basic principles codified in space law treaties. However, it is also true that there are several reasons to reopen a phase of assessment of the UN Principles within the competent fora, such as the COPUOS Legal Subcommittee. This should be a debate on a more limited issue, namely the desirability of reviewing the 1986 Principles. This option has the merit of not questioning the soft-law character of the Principles, but to assess how the key statements contained in the 1986 UN Principles have been implemented and the obstacles that hamper their full application.

In this vein, I fully share the view expressed by the Author in the Discussion paper that, according to the policies adopted by the commercial operators, the sensed states do not have priority for acquisition of data over their territories if they are unable to pay the high premium which the other customers in any part of the world are ready to pay, even if those customers make such request later than the sensed state. Thus there could be tensions, particularly when a state considers that entities abroad have exploited information about its territory even as it had no fair or affordable access to the same due to commercially driven policies. Even more, since the data availability from commercial systems providing high resolution data will be mainly driven by the market considerations, the affordability for accessing such data will be another major issue for a large number of states, particularly for developing states.

In conclusion, I do agree, on the one hand, that the provisions in the UN principles applicable to States conducting remote sensing activities are to be implemented through a set of national regulations or policies. This assumes even greater significance when commercial entities in private sector conduct these activities. Other wise principles of respecting non-discrimination, ensuring access to sensed states of data over their territories, sovereign rights of states, protection of environment, timely response to disasters and assistance to developing countries could come in conflict with commercial goals and policies.

On the other hand, it is time for reopening the debate within the COPUOS Legal Subcommittee taking into account that there is a need for harmonization at the international level. We are faced with new challenges, which were not anticipated at the time of adoption of 1986 remote sensing principles by the UN, such as the high resolution images made available through space based remote sensing. This imposes a new phase to find out the most appropriate legal solutions.

Session 4

Legal Aspects of Disaster Management: Initial Results and Suggestions for Improvement of the International Charter on Space and Major Disasters

SPACE CONTRIBUTION FOR DISASTER MANAGEMENT: LEGAL FRAMEWORK

By

Dr I B R Supancana*

I. GENERAL

A. Background

In the period of less than a decade (from November 2000 to May 2005) we could observe of more than 66 major disasters all over the world, from earth quake and Tsunami in Southern Asia[1]; Mount Etna Volcano Eruptions in Italy[2]; Floods in Argentina[3]; Forest fires in British Columbia (Canada)[4]; Hurricane in Cook Island[5]; Typhoon in Philippines[6]; Floods and landslides in Haiti and Dominican Republic[7]; Landslides in North Ossetia (Russia)[8]; to the Oil spill and Marine pollution in Galapagos[9]; and even Train Explosion in Ryongchon, North Korea.[10] From 1994 to 2003 there were more than 300 natural disasters on average every year, impacting more than 100 countries, killing over 50,000 people, affecting nearly 260 million people and causing economic damage to US $ 55 billion each year.[11] The economic cost associated with natural disasters has increased 14-fold since the 1950's.

In a way to anticipate and reduce the risk from future major disasters, there is a need to develop a better response and disaster management both at the domestic, national, regional and global level through effective coordination mechanism. All resources and parties must be involved in such efforts in the name of humanity and sustainable development. Those resources will include not only fund, organization, but also technology. In this case space technology could play important role.

B. Purpose and Objectives

1. The purpose of this paper is to explore ways and means to formulate and implement effective legal framework to support disaster management efforts by using and implementing space technology and organizations;
2. While the objectives would be to contribute to humanity through better approach in disaster management.

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1 26 December 2004.
2 26 July 2001.
3 30 April 2003.
4 07 August 2003.
5 05 February 2005.
6 01 December 2004.
7 26 May 2004.
8 27 September 2002.
9 26 January 2001.
10 23 April 2004.
11 UNGA Doc A/AC.105/C.1/L.285

II. NATURAL DISASTER, DISASTER MANAGEMENT AND SPACE TECHNOLOGY CONTRIBUTION TO DISASTER MANAGEMENT

A. Indonesia Experience

Indonesia is a prone natural disaster country. Within the last 2 (two) years Indonesia has been streaked by several major disasters, such as: Tsunami in Aceh and in North Sumatra by the end of 2004; Earth Quake in Yogyakarta in May 2006; Mount Merapi Eruption in Yogyakarta and Central Java in May-June 2006; Floods and Mudslide in West Java, East Java and South Sulawesi in 2005 and 2006. The Tsunami has taken the lives of more than 200.000 people while Earth Quake took the lives of more than 6000 people. Most of the infrastructure in the affected area is totally destroyed. It needs quite sometime in the rehabilitation and reconstruction process which will absorb huge amount of sources. Not mentioning the efforts to heal/cure the people who suffer from such disasters.

In Indonesia The National Disaster and Refugee Coordination Board (Bakornas PBP) is in charge as coordination body for national disaster at national level,[12] while at Provincial level is Satkorlak (the coordinating task forces at the provincial level),[13] and at Satlak is Task Forces at Regency/City level.[14]

Bakornas PBP's main tasks are:

a. Helping the President plan for natural disaster;
b. Handling natural disasters, establishing early warning systems, dealing with emergency situations and disaster rehabilitation through to the recovery phase;
c. Creating policy and guidelines;
d. Coordinating other aid groups;
e. Coordinating provincial and regional task forces;
f. Providing humanitarian aid, transportation and medical assistance, information and security.

Bakornas PBP's structure consist of Health Ministry, Public Works Ministry, Social Welfares Ministry, The Arm Forces (TNI), Red Cross, Transportation Ministry, Mining and Energy Ministry and Information Ministry. Similar structure applies to both at Satkorlak (provincial level) and Satlak (regency/city level).

During the operation and relief efforts in the above natural disasters, the international communities, both countries, inter-governmental organization and non-governmental organizations, have shown their sympathy and empathy by providing aids in almost every aspects. The contributions from the international community are ranging from: search and recovery and clean up operation, providing foods and the daily needs, medical aids, to rehabilitation and reconstruction process. An international summit for coordinating the relief efforts and international aids were also held in Jakarta just a month after the Tsunami. Participation and contribution from the international community have shown that "humanity" is

[12] Bakornas PBP is chaired by Vice President.
[13] Satkorlak is chaired by Governor of the Province.
[14] Satlak is chaired by Regent or Mayor.

the main consideration for providing aid relief without considering the distinction of race, religion, nationalities and even ideologies.

During relief and rehabilitation efforts of the Tsunami in Aceh; Volcanic Eruption in Yogyakarta; Earth Quake in Nabire and Yogyakarta; Flood and Mudslide in West Java and East java, some difficulties were faced. They criticized Bakornas PBP for being too bureaucratic which in some ways hampering the speedy process in disaster relief and operation to help disaster victims. They claim that Bakornas PBP and its subsystems were no longer effective because they were unprofessional and too bureaucratic and therefore need to be reformed.[15] Reform would mean replacing untrained bureaucrat with paid professionals, who were given the authority to coordinate with government agencies. The European Union's team and Saudi Arabian rescue workers have also noted coordination difficulties in aid and relief efforts.[16]

As disaster requires an immediate response, not bureaucratic or formal time consuming procedures, there is a need for better approach to disaster relief efforts, so called, organizational network. In the context of a disaster, a network is a form of governance that refers to multi organizational arrangements for solving problems that cannot be fixed or fixed easily, by single organizations. In network, coordination is important to minimize redundant task, incoherence, incompatibilities, tensions and conflicts among organizations.[17]

By learning from two (major) disasters which have streaked the country within two (2) years, the government needs to open up for resources from various organizations, be they non-profit, for profit, civilian and military. Yet the government is not without an essential role to play. The government needs to be the "center" of operation, not necessary the resources. It needs to coordinate the relief efforts to go on.

B. The Tsunami Experience in the Region

The Tsunami disaster in December of 2004 not only hit Indonesia but also it's neighboring countries in the region, such as: India; Thailand; Malaysia, Madagascar, Ceylon, etc. International sympathy, empathy, aids and attention have been given to the Tsunami considering the magnitude of such disaster. The contribution of the international community is not only confined to countries, but also involve international organizations (both governmental and non-governmental), and even individuals.

The main important issue during the relief operation, rehabilitation and reconstruction of the affected area caused by Tsunami is coordination issue. None of the affected countries in the region have experiences in handling such scale of disaster. On the one hand none of these countries have any reference how to deal with coordination issues which could satisfy the interest of all relevant parties such as victims, donors, volunteers, local government, etc. On the other hand there was the need for speed response for disaster mitigation and risk reduction.

The affected countries and international community have learned a lot from the Tsunami how to cope with similar scale of disaster which would possibly happen in the future through

[15] See Ridwan Max Sidjabat, "Disaster Agency's Role in Spotlight", Jakarta Post, 1 June 2006.
[16] See, *Ibid.*
[17] See, Adi Kusuma, "Role of Bureaucracy in Disaster Relief", Jakarta Post, 8 June 2006.

improvement of disaster management. It should be understood that in the broadest sense, disaster management shall cover activities, including but not limited to: prevention, [18] preparedness, [19] early warning, [20] emergency response, relief, evacuation, mitigation, recovery, rehabilitation and reconstruction.

C. Contribution of Space Technology

Space-based technologies, such as such as meteorological and Earth observation satellites, communication satellites and satellite-based positioning technologies offer the potential for improved risk reduction, accurate prediction, early warning and monitoring of the impact of disasters for enhanced relief and rehabilitation operations, use of which would lead to major reductions in loss of life and property. Here are some of the details:

1. Earth observation satellite have demonstrated their utility in providing data for a wide range of applications in disaster management;[21]
2. Meteorological satellite can monitor weather patterns, detect and track storms, and monitor frost and floods;[22]
3. Global navigation satellite system (GNSS). Such the Global Positioning System (GPS) of the USA and GLONASS of the Russian Federation, provide accurate position, velocity and time information that is readily accessible at ground level to anyone with a receiver;[23]
4. Communication satellites enable the setting up of emergency communication channels and increasingly being used by all those responding to emergency.[24]

[18] Prevention is any efforts which are taken to prevent disaster or risk that may be arisen from it by eliminating the danger through certain preparation measures, such as: regulatory framework, setting up procedures and socialization activities by learning and training.

[19] Preparedness is the condition of which certain anticipation has been made to face the disaster by organizing and implementing effective and efficient measures.

[20] Early warning is any efforts to provide warning signals that a disaster might possibly occur. Such early warning should be accessible, immediate, coherent and official.

[21] Pre-disaster uses include risk analysis and mapping; disaster warning, such as cyclone tracking, drought monitoring, the extent of damage due to volcanic eruptions; and disaster assessment, including flood monitoring and assessment, estimation of crops and forestry damages, and monitoring of land use/change in the aftermath of disasters. Remotely sensed data also provide a historical database from which hazard maps can be compiled, indicating which area are potentially vulnerable. Information from satellites is often combined with other relevant data in geographic information system (GIS) in order to carry out risk analysis and assessment. GIS can be used to model various hazard and risk scenarios for planning the future development of an area. See Ibid, paragraph 9.

[22] Derived products are produced routinely several times per day; many of them focused on particular hazard events. Tracking sequences of tropical cyclone images from geostationary satellites as well as storm intensities and atmospheric winds derived from these images provides vital information for forecasting landfall contributing to saving lives. Additionally, the integration of experimental products, such as ocean surface winds from scatterometer instruments and moisture or rainfall from microwave instruments, has improves these forecasts.

[23] The reduction in size and cost of receivers is contributing to widening the number of users that are now using such technological solutions to collect data to support risk reduction and emergency response activities.

[24] Additionally, there is the need to receive information from and send information to the various emergency response teams working in the field, including large data files such as maps and satellite images.

III. LEGAL FRAMEWORK FOR DISASTER MANAGEMENT

A. Past and Current Initiatives

1. World Conference on Disaster Reduction, Kobe, Japan, 18-22 January 2005

The conference recognized the contribution of space technology to disaster reduction and emphasized the need to incorporate space-based services routinely to support risk reduction. A list of commitments is set out in the Hyogo Framework of action 2005-2015 which will contribute to substantially reduce the losses in lives and social, economic and environmental assets of communities and countries.[25] Some other documents were resulted, such as: Review of the Yokohama Strategy and Plan-of Action for a safer World; The Hyogo Declaration; and Common Statement of the Special Session on the Indian Ocean Disaster. Risk Reduction for a Safer Future.[26]

2. UN/Algeria/European Space Agency International Seminar on the Use of Space Technology for Disaster Management: Prevention and Management of Natural Disaster, Algiers 22-26 May 2005

During the seminar, the key issues on disaster management and the contribution of space technology were presented and discussed, covering issues, such as:[27]

a. How space technology could best be applied to disaster management in the Northern Africa Region;
b. An overview of current best practice in the use of space technology for disaster management;
c. International cooperation in disaster management;
d. The Case study of Ceylon's experienced in relation to the Tsunami in the Indian Ocean in 2004.

Some important recommendations from the seminar are among others:[28]

a. Identification of the need for a regional task force that would bring together civil protection and space technology institutions;
b. The need for capacity building at the national level for the integration of space technology into prevention and management of national disasters, in particular through training based on existing regional and national structures and specialized centers;
c. The proposal for the implementation of a regional task force for the North African Region for coordination between civil protection agencies and space technology institutions.

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[25] UNGA, "Draft study on the possibility of creating an international entity to provide for coordination and means realistically optimizing the effectiveness of space-based services for use in disaster management", 5 October 2005.
[26] These documents can be found on the UNISDR website: http://www.unisdr.org/wcdr.
[27] See UNGA Doc no A/AC.105/852 of 28 September 2005. For further detail on the presentation during the seminar, visit the website www.asal-dz.org.
[28] See Ibid, paragraph 34-36.

3. Munich International Workshop on Disaster Management of October 2004

The workshop organized by OOSA discussed a global strategy that would contribute to helping developing countries have access to and be able to use space technology for disaster management. The participants recognized that space-based technologies such as Earth observation satellite, communications satellite, meteorological satellites and global navigation satellite systems, play an important role in risk reduction and disaster management. A strategy was put forward as "The Munich Vision: A Global Strategy for Improved Risk Reduction and Disaster Management Using Space Technologies". A number of recommendations were also put forward, namely:[29]

a. Capacity development and knowledge building;
b. Data access, data availability and information extraction;
c. Enhancing awareness;
d. National, regional and global coordination.

4. UN Regional Workshop on the Use of Space Technology for Disaster Management for Western Asia, Riyadh, 2-6 October 2004

The presentations at the seminar covered the following issues:[30]

a. The application of space technology in the management of a wide variety of disasters and the current status of the use of space technology in disaster management;
b. The existing constraints in applying space technology;
c. Case studies on the use of space technology for various forms of disaster management;
d. The need of the end-user, and examples on the use of space technology in various phase of disaster management- the disaster itself, response, recovery, reconstruction, mitigation and preparedness;
e. Examples of integrated solutions for space technology and disaster management;
f. Innovative developments and initiatives.

Some important recommendations from the workshop are:[31]

a. Capacity building and knowledge-building;
b. Networking and coordination mechanisms;
c. Data availability and data access;
d. Space technology infrastructure;
e. Awareness raising;
f. A common regional plan of action and commitments;
g. Demonstrating the use of space technology.

[29] UNGA, "Draft study on the possibility of creating international entity to provide for coordination and the means of realistically optimizing the effectiveness of space-based services for use in disaster management", 5 October 2005, paragraph 41.
[30] See UNGA Doc no A/AC.105/836 of 13 December 2004, paragraph 13-20. For further detail of the presentations, visit the website www.oosa.unvienna.org/SAP/stdm.
[31] Ibid, paragraph 26-42.

5. World Conference on Natural Disaster Reduction, Yokohama, 23-27 May of 1994

The important results of this conference are: the Yokohama Message and Yokohama Strategy and Plan of Action. The Yokohama Message affirms that:[32]

a. The impact of natural disaster in terms of human and economic losses has risen in recent years, and society in general has become more[33] vulnerable to natural disaster;
b. Disaster prevention, mitigation, preparedness and relief are four elements which contribute to and gain from the implementation of sustainable development policies;
c. Disaster prevention, mitigation and preparedness are better than disaster response in achieving the goals and objectives of the decade;
d. The world is increasingly interdependent. All countries shall act in a new spirit of partnership to build a safer world based on common interests and shared responsibility to save human lives, since natural disaster do not respect borders;
e. The information, knowledge and some of the technology necessary to reduce the effect of natural disasters can be available in many cases at low cost and should be applied;
f. Community involvement and their active participation should be encouraged in order to gain greater insight into the individual and collective perception of development and risk, and to have a clear understanding of the cultural and organizational characteristics of each society as well as of its behaviors and interactions.

The Yokohama Strategy and Plan of Action contain:

a. Principles; basis for the strategy; assessment of the status of disaster reduction midway into the Decade; and strategy for the year 2000 and beyond;
b. Plan of action; activities at regional and sub-regional level; activities at the international level, in particular through bilateral arrangements and multilateral cooperation;
c. Follow-up of action.

B. Existing International Institution dealing with Disaster Management

1. UNOOSA

UNOOSA has played a very important role in coordinating and facilitating activities in the framework of Space Technology and Disaster Management. The main goal of this initiative is that in order for developing countries to be able to incorporate the use of space-based technology as their solutions to deal with natural disaster, there is a need to increase awareness, build national capacity and develop solutions that are customized and appropriate to the needs of developing countries. To achieve the above goal UNOOSA has facilitated a series of regional workshops from 2000 to 2005 in order to better use space technology for disaster management, and also to strengthen cooperation of the task force at the regional level.

[32] See OOSA Doc, "Space Technology and Disaster Management", 2005, page 5-6.
[33] *Ibid*, page 7-15.

2. UNCOPUOS

As a political forum where space issues are discussed through its Scientific and Technical Sub-Committee, Legal Sub-Committee and Parent Committee, UNCOPUOS have played very important role, including in the efforts to utilize space science and technology as a way to deal with natural and technological disaster for the purpose of disaster mitigation, risk reduction, disaster management, etc.

3. The International Telecommunication Union (ITU)

ITU Contribution to disaster management includes:[34]

a. In 1998 involved in the drafting of Tampere Convention;
b. In 2002 the World Telecommunication Development Conference adopted Resolution no 34 (telecommunication resources in the service of humanitarian assistance) and Recommendation 12 (consideration of disaster telecommunication needs in telecommunication development activities);
c. In 2002 ITU Plenipotentiary Conference adopted Resolution 36 (telecommunication in the service of humanitarian assistance);
d. In 2003 World Radio-communication Conference (WRC) adopted Resolution no 646 (definition of reserved spectrum for emergency communication).

Some of the works of ITU Sectors have also been dedicated to disaster management, for example:

a. ITU-D (the Telecommunication Development Sector) considers disaster as parts of its mandate. The four (4) main principles of ITU-D in dealing with disaster management are: multi hazard; multi technology; multi phased; and multi shareholder.[35] During the Tsunami ITU-D established a Tsunami emergency team that worked with the effected countries to assess their immediate needs;[36]
b. ITU-R (the Radio Communication Sector) dealing with aspects of radio-communication services associated with disaster include, inter-alia, disaster prediction, detection, alerting and disaster relief;[37]
c. ITU-T (the Telecommunication Standardization Sector). Though ITU-T is not involved in emergency and disaster relief operation, per se, however it develops recommendation that are fundamental for the implementation of inter-operable systems and telecommunication facilities that will allow relief workers to smoothly deploy telecommunication equipment;[38]

Since January 2005, ITU has participated in a series of high-level international meetings seeking to enhance preparedness through early warning system, response, relief and reconstruction.[39]

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[34] See 43rd session of Scientific and Technical Sub Committee of UNCOPUOS 2006. UN Doc A/AC.105/C.1/2006/CRp.13 on "Activities of Specialized Agencies in the UN System on the Subject of Space-Based –System Disaster Management Support, paragraph 1-3.
[35] *Ibid*, paragraph 4-9.
[36] *Ibid*, paragraph 21.
[37] *Ibid*, paragraph 11.
[38] *Ibid*, paragraph 16.
[39] Ibid, paragraph 23.

4. ESCAP (The UN Economic and Social Commission for Asia and the Pacific) and its RESAP (The Regional Space Application Program for Sustainable Development)

ESCAP place an emphasis on increased contribution of space technology for sustainable development and improved quality of life in Asia and the Pacific, and disaster management has been one of its priorities.

Space applications for disaster management are a topic addressed by ESCAP using both sectoral and multi sectoral approaches. In addition to the major contributory fields of earth-observations and satellite communications, the issue of disaster management is also addressed through the application of space-based distance education, tele-health and the empowerment of community through community e-centers.

Since 2002, a series of activities have been organized by the ESCAP secretariat on the use of space technology for disaster management under RESAP. Those activities are parts of the goal of ESCAP to help prepare the region for pursuing the development of improved regional cooperative mechanism for disaster management, but not limiting to space technology. Some partnership cooperation with other organizations such as ITU and Asia-Pacific Satellite Communication Council (APSCC) has been planned to organize meetings on disaster management. ESCAP also promoting and supporting the implementation of the Tampere Convention for the development of an affordable/sustainable implementation of deployable satellite-communication-enriched disaster response capabilities.

As part of the ESCAP regional strategy on disaster reduction, RESAP intends to place more emphasis on disaster management and on developing national and regional capacity in the coming years in order to:

a. Assess hazard risk;
b. Promote preparedness and risk reduction;
c. Establish multi-task national/regional warning and response system;
d. Facilitate community-based disaster reduction; and
e. Develop linkages to other UN and regional initiatives related to disaster management using space technology.

ESCAP also support the Scientific and Technical Sub-Committee's works on the establishment of a global system to manage natural disaster mitigation, relief and prevention as recommended in Vienna Declaration.

C. International Legal Instruments

1. Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters

The Charter, known as International Charter "Space and Major Disaster" was initiated by the European Space Agency (ESA) and the France Space Agencies (CNES) which was declared formally operational on November 1 of 2000. Some major space agencies from space faring nations such as: The United States National Oceanic and Atmospheric Administration (NOAA), Canadian Space Agency (CSA), the Indian Space Research Organization (ISRO), the

Japan Agency for Aerospace Exploration Agency (JAXA) have also become members.

The Charter consist of 6 articles, namely: definitions; purpose of the Charter; overall organization of cooperation; contributions by the parties; associated bodies; accession; entry into force, expiry and withdrawal; and implementation.

The purpose of the Charter is to promote cooperation between space agencies and space system operators in the use of space facilities as a contribution to the management of crisis arising from natural or technological disasters. While the objectives are: to provide data as a basis for critical information for the anticipation and management of potential crisis; and to participate in the organization of emergency assistance or reconstruction and subsequent operations.[40]

A board on which each party is represented and executive Secretariat will be in charge of administrative, operational and technical coordination for implementation of the Charter. A mechanism of cooperation and coordination among Beneficiary Bodies,[41] Associated Bodies[42] and Cooperating Bodies[43] is also served under this Charter.[44]

The contribution of the parties includes, among others:[45]

a. Space facilities available for use;
b. Analyze recent crises for which space facilities could have provided or did provide effective assistance to the authorities and rescue services concerned;
c. Identifying of a crisis situation for which it requires intervention of the parties;
d. Planning of space facility availability in the event of a crisis;
e. Supply associated bodies and, where appropriate, beneficiary bodies with data, and if necessary associated information and services, gathered by the space facilities;

2. The Tampere Convention on the Provision of Telecommunication Resources for Disaster Mitigation and Relief Operations

The Convention that entered into force on 8 January 2005 following the ratification by the 30th country, will contribute to the greater availability of telecommunication equipment for disaster mitigation and relief. The Tampere Convention is a legally binding international instrument aimed at helping relief workers brings telecommunications equipment across borders during and after an emergency, with a minimum difficulty.

[40] See, Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in The Event of Natural Or Technological Disasters of 2000, article II.
[41] The authorities and bodies concerned in a country affected by a disaster.
[42] An institution or service responsible for rescue and civil protection, defense and security under the authority of a State whose jurisdiction covers an agency or operator that is a party to the Charter, or of a Member State of ESA or of an international organization that is a party to the Charter (see the Charter, op.cit Article V para 5.2).
[43] The European Union, The UN Bureau for the Coordination of Humanitarian Affairs and other recognized national or international organizations, whether governmental or non-governmental.
[44] See, *ibid*, article III.
[45] For further detail, read Article III of the Charter.

D. The possibility of establishing Coordinating Body on International Space Cooperation and Disaster Management

As a part of implementing the recommendation of the Third United Nations Conference on the Exploration and Use of Outer Space (UNIISPACE III)[46] an action team (known as Action Team 7) was established by focusing on "studying and recommending the implementation of integrated operational global system, especially through international cooperation, to manage natural disaster mitigation, relief and prevention efforts through earth observation, communication and other space-related services, making maximum use of existing capabilities and filling gaps in worldwide coverage".[47] Through a comprehensive process of consultation, surveys, analysis of gaps and needs, the team submitted its finding and recommendations to the forty-first session of the Scientific and Technical Sub Committee of the UNCOPUOS.[48] One of its recommendations is to implement an international space coordination body for disaster management, nominally identified as the "Disaster Management International Space Coordination Organization (DMISCO)".[49] Such a body would have the mandate to provide the necessary means to optimize the access to and use of current and future space-based services for disaster management.

The recommendation on establishment of DMISCO was further submitted to the General Assembly at its 59th session in 2004. During the session, General Assembly agreed "that a study should be conducted on the possibility of creating an international entity to provide for coordination and the means of realistically optimizing the effectiveness of space-based services for use in disaster management and that the study should be prepared by an ad-hoc expert group, with expert to be provided by interested Member States and relevant international organizations". The ad hoc Expert Group agreed that the international space coordination body recommended by Action Team 7, DMISCO, would provide such a coordinating mechanism.[50] The key aspects that the expert emphasized was that DMISCO has to be identified as a platform for fostering alliances of international initiatives and mechanisms (space technology and disaster management). The initial emphasis of its activities and services should lie in the coordination and interaction with relevant national authorities, scientific institutions, organizations implementing and/or providing space-based solutions, humanitarian, environmental and civil protection actors, and the space community.[51] The experts also further defined the key informational, coordination and operational function of the proposed entity.[52] Some possible benefit from the implementation of the Coordination Entity would cover the following area: capacity development and knowledge building; data access, data availability and information extraction; and enhancing awareness.[53] Other relevant aspects to be considered toward the establishment of DMISCO would include: organizational scope and nature; relationship with

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[46] UNISPACE III Recommendation (1999) "recommending the implementation of an integrated operational global system…..to manage natural disaster mitigation….through earth observation, communications and other space related services, making maximum use of existing capabilities and filling gaps in worldwide coverage."
[47] See UNGA, "Draft Study on the Possibility of Creating an International Entity to Provide for Coordination and the Means of Realistically Optimizing the Effectiveness of Space-Based Services for use in Disaster Management", 5 October 2005, paragraph 1.
[48] In 2004.
[49] Op.cit, paragraph 2.
[50] *Ibid*, paragraph 42.
[51] *Ibid*, paragraph 45.
[52] *Ibid*, paragraph 46-48.
[53] See *ibid*, paragraph 50-61.

existing and planned international organizations and initiatives; mobilization of resources (fund); and implementation plan.

During the 43rd session of the Scientific and Technical Subcommittee in 2006, the Group of expert presented the study on the possibility of Creating a Disaster Management International Space Coordination Entity.[54] The focus of DMISCO would be:[55]

a. "One stop shop" and a platform for fostering alliances;
b. It should be user driven;
c. Bridge the gap between the disaster management organizations, creating a forum where both can meet;
d. Contribute to making optimal use of the existing available resources;
e. It should interact with other relevant initiatives and organizations;
f. Focus on existing gaps that are limiting the use of space technology;
g. It should have informational, coordination and operation function.

The UNCOPUOS during its 49th Session in 2006 (Vienna, 7-16 June of 2006) have agreed in endorsing the Report of the Ad Hoc Group of Experts. Regarding the host of DMISCO, there was a compromise to select Beijing and Bonn to be the co-hosts. The selections of the two (2) cities were based on the fact that the People Republic of China and the Federal Republic of Germany have been most active and offered the best condition.

Considering the importance of having a global coordinating body which would coordinate the efforts of international community in all stages of disaster management, the idea of establishing DMISCO should be welcomed. The establishment of DMISCO can be initiated with implementation of certain UN Program in order to convince relevant stakeholders within the international community on the importance of such organization in the name of humanity.

IV. CONCLUDING REMARKS

A. The lesson that we should learn from the impact of the past disasters, both natural disasters and technology disasters is the need to have a better management in dealing with the future disasters both in prevention, preparedness, early warning, emergency response, relief, evacuation, mitigation, recovery, reconstruction and rehabilitation processes.

B. The past experiences have shown that participation, support and active involvement of the international community in the name of humanity (irrespective of their nationality, race, religion, ideologies) has played substantial role in improving disaster management and disaster mitigation;

C. In the process of improvement in disaster management it is proven that the application of space technology contribute substantially to such efforts;

D. A better coordination mechanism in dealing with disaster is a real need that should be accommodated by a better legal framework through binding legal instruments and the existence of effective special international organization dealing with it.

[54] See UN Doc A/AC.105/C.1/L.285 concerning "Study on the possibility of creating an international entity to provide for coordination and the means of realistically optimizing the effectiveness of space-based services for use in disaster management".
[55] *Ibid.*

COMMENTS ON THE DISCUSSION PAPER "SPACE CONTRIBUTION FOR DISASTER MANAGEMENT: LEGAL FRAMEWORK" WITH SPECIFIC EMPHASIS ON THE DISASTERS CHARTER

By

Prof. Joanne Irene Gabrynowicz[*]

I. Introduction

In his discussion paper, Dr. I.B.R. Supancana provides an excellent review of various conferences, seminars, workshops, and related activities that have occurred in recent years regarding the increasingly important subject of disaster management. The paper also provides essential insight into the Indonesian and regional experiences with disasters and disaster management. This, most importantly, provides a compelling, human aspect to a complex series of policy, legal, economic, and political issues. There is no question but the human suffering that has occurred and unfortunately, in all likelihood, will continue to occur as a result of natural and technological disasters creates a moral imperative that must be responded to by all the world's Nations.

It is important to bear in mind that disaster management is an issue for the long-term. Indeed, it ought to be considered an eventual permanent feature of humanity's future on Earth. Therefore, disaster management must be considered in the near term, the intermediate term, and for the permanent future. It is also necessary to consider disaster management as on-going activity that will evolve over time as lessons are learned and as experience is gained.

Disaster management, like many other activities that require the leadership of Nation-States and inter-governmental organizations, has competing models of how it ought to develop. However, whatever model or models, prevail, all participants acknowledge the importance of, and the intent to build upon, the *Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters*.[1] "It is being recognised as an efficient framework at [*sic*] international level, setting new standards and serving as a reference."[2] "The remarkable achievement of the Charter is that it has coordinated different space resources, brought together different entities, and brought the legal principles derived from space law into reality."[3] Dr. Supancana's paper briefly sets out the purpose of the Disasters Charter.[4] These comments will address and expand upon that aspect of the discussion paper.

II. The Disasters Charter: Definitions and Scope

As with all instruments a critical part of the Disasters Charter is its definitions section. Definitions are where rights and obligations begin and end and they are the starting point for

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[1] *Hereinafter* the Disasters Charter, available at http://www.disasterscharter.org/main_e.html. Last visited 14 July 2006.

[2] J. Béquignon and S. Briggs, *The 'Space and Major Disasters' International Charter*, ESA Bulletin 107, August 2001, pg. 83.

[3] Atsuyo Ito, *Issues in the implementation of the International Charter on Space and Major Disasters*, 21 SPACE POL'Y 141 – 149 (2004), at 141–142.

[4] Dr. I.B.R. Supancana, *Space Contribution for Disaster Management: Legal Framework*, 5-6.

additional progress. They set out the scope of the agreement and are the foundation for on-going development. A review of the definitions in the Disasters Charter reveals the drafters' intention to include and authorize a broad range of Charter participants beyond traditional Nation-States in order to enable pragmatic responses to a disaster by the entities most qualified to do so. They also reveal that a "disaster" includes natural and technological occurrences. The definitions also identify certain resources that are to be made available to enable a response. These extend from resources generated by space-based assets to those that can be produced *in situ* on the ground.

A. Participants

There are four categories of participants in the Disasters Charter: parties, associated bodies, cooperating bodies, and beneficiary bodies. "[P]arties mean"[5] the signatory "agencies and space system operators". "Associated bodies" [6] are defined as the "rescue and civil protection, defence and security or other services"[7]…"under the authority of a State whose jurisdiction covers an agency or operator that is a party to the Charter, or of a Member State of ESA or an international organization"[8] that is a party. The role of an "associated body" is to request intervention of the parties.[9]

"Cooperating bodies" are the European Union, the U.N. Bureau for Coordination of Humanitarian Affairs and other "recognised" governmental or nongovernmental national or international organizations.[10] "Beneficiary bodies" are those that benefit from crisis management information, for example, in affected countries. [11]

B. Covered Disasters

Both "natural" and "technological" disasters are covered. Each is defined as a "situation of great distress" involving loss of human life or large-scale property loss. They include cyclones, tornadoes, earthquakes, volcanoes, floods, and, fires, among other things. The Disasters Charter includes a variety of "technological accidents" such as hydrocarbon, toxic, or radioactive pollution. [12] The Charter also addresses the concept of "crisis" which is the "period immediately before, during, or immediately after" an event in which "warning, emergency or rescue operations take place." [13]

C. Available Resources

Resources to be made available under the Disasters Charter include data, information, and facilities. "Space data" is defined as "raw data gathered by a space system" controlled or accessed by a party and "transmitted or conveyed" to a ground station.[14] "Information" is "data

[5] Disasters Charter *supra*, note 1, at Article I.
[6] *Id.*
[7] *Id.*
[8] Disasters Charter *supra*, note 1, at Article 5.2.
[9] Disasters Charter *supra*, note 1, at Article 5.4.
[10] Disasters Charter *supra*, note 1, at Article 3.5.
[11] Disasters Charter *supra*, note 1, at Article I.
[12] *Id.*
[13] *Id.*
[14] *Id.*

that have been corrected and processed by the parties using an analysis program, in preparation" for crisis management use by associated bodies to aid beneficiary bodies. Information "forms the basis for extraction of products on location".[15] "Space facilities" consist of a wide range of applications including space systems for "observation, meteorology, positioning, telecommunications, and TV broadcasting".[16]

D. *Basis of Participation*

The primary characteristic of participation in the Disasters Charter is that it is done on a "voluntary basis" without the "exchange of funds".[17] The standard for participation is "best endeavours".[18] Accession by additional parties is provided for and the "widest possible accession" is encouraged.[19] Contributions made by a "party intending to withdraw" may continue after withdrawal because the party "shall endeavor to maintain continuity of its current contribution."[20]

Participants agree that they "shall" maintain an "up-to-date list" of available facilities and descriptions, including "as far as possible" private or public operators to supplement the parties' own facilities.[21] They will also provide "data and if necessary associated information and services".[22] Both "operational and technical coordination" is intended and it "shall be provided by a Board on which each party is represented" and there is an "executive Secretariat for implementation."[23] The Disasters Charter is in force for five-year periods and "shall be automatically extended for subsequent periods of five years.[24]

III. Nature of the Disasters Charter

The Disasters Charter is an example of a growing class of instruments used since the end of World War I that represent "many new ways of doing business"[25] in international affairs. They emerged to facilitate a growing number of activities and objectives less suited to the formal treaty making process. Space activities have been a part of this trend. "There is a greater international presence in outer space than ever before, which in many cases is the result of alternative and innovative methods of international cooperation."[26] Alternative forms of space cooperation are recognized in the *Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries* that was adopted by the U.N. General Assembly.[27] The Disasters Charter is an instrument created by one of these alternative methods,[28] and participation is on a "voluntary basis".[29]

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[15] *Id.*
[16] *Id.*
[17] Disasters Charter *supra*, note 1, at Article 3.1.
[18] Disasters Charter *supra*, note 1, at Article IV.
[19] Disasters Charter *supra*, note 1, at Article 6.1.
[20] Disasters Charter *supra*, note 1, at Article 7.1.
[21] Disasters Charter *supra*, note 1, at Article 4.1.
[22] Disasters Charter *supra*, note 1, at Article 4.5.
[23] Disasters Charter *supra*, note 1, at Article 3.3.
[24] Disasters Charter *supra*, note 1, at Article 7.2.
[25] ANTONY AUST, MODERN TREATY LAW AND PRACTICE 26 (Cambridge University Press 2000).
[26] Marco Ferrazzani, *Alternative Approaches to International Space Cooperation,* ESA Bulletin 110, May 2002, pg. 76.
[27] G.A. Res. 51, U.N. GAOR, 51st Sess., U.N. Doc. A/RES/51/122 (1997).
[28] Ferrazzani, *supra*, note 26, at 78.
[29] Disasters Charter *supra*, note 1, at Article 3.1.

Although the Disasters Charter is an "international multilateral instrument…containing non-binding principles"[30] "[a]s long as [it lasts as a] nonbinding agreement…[it] can be authoritative and controlling for the parties. There is no *a priori* reason to assume that the undertakings are illusory…"[31] "[P]olitical texts which express commitments and positions of one kind or another are governed by the general principle of good faith. Moreover, since good faith is an accepted general principle of international law, it is appropriate and even necessary to apply it in its legal sense."[32]

IV. Charter Status and Relevant Factors over Time

The fact is since 2000, satellite-operating nations through their agencies or space system operators had their satellite tasking priorities changed approximately 80 – 100 times to provide timely, critical data at no cost to both developing and developed nations suffering a wide variety of disasters.[33] Successful Charter activation has catalyzed a number of results and emerging practices that may be relevant to its status over time. "A non-legal text may also over time become customary law on the basis of state practice and *opinio juris*. That consequence does not depend on the original intent of the parties to the instrument."[34] As regards the "scientific and space community…[t]he more effective the informal character and behaviour agreed by the parties proves to be, the more this practice becomes recognised as perfectly and politically authoritative. This is where the border begins to blur between the classical binding agreements and the newer, less formal alternatives."[35]

Over time, it will be important to assess the quantity and quality of a wide variety of variables to assess the Charter's potentially evolving status. These include the frequency and number of activations and responses, their quality and effectiveness; additional standards of behavior, if any, established by voluntary actions; the withdrawals, if any, of parties; and, the addition of any parties, associated bodies, and cooperating bodies. Perhaps the most important variable will be the number of automatic renewals it receives. Arguably, the more the Disasters Charter is renewed, the more it becomes a binding agreement.

In addition to analyzing the use and interpretation of the Charter itself, its status will be determined by applying relevant general principles of law and assessing related activities. These include related treaties or agreements; decisions of national and international courts; national legislation; diplomatic correspondence; opinions of national legal advisers; and, the practice of international organizations.

V. Some Observations and Conclusions

Moving forward, it will be necessary to identify differences and commonalities in various instruments that govern and guide Disasters Charter activations. There are definitional differences for "data" and "information" in the Disasters Charter and the Principles Relating to

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[30] Ferrazzani, *supra*, note 26, at 76.
[31] Oscar Schachter, *The Twilight Existence of Nonbinding International Agreements*, 71 A.J.I.L. 296 (1977) at 304.
[32] Oscar Schachter, INTERNATIONAL LAW IN THEORY AND PRACTICE, 130 (Martinius Nijhoff 1991).
[33] The Charter in Action, http://www.disasterscharter.org/disasters_e.html last visited 16 July 2006.
[34] Lori F. Damrosch, et al., INTERNATIONAL LAW CASES AND MATERIALS 157 (West Group 2001).
[35] Ferrazzani, *supra*, note 26, at 80.

Remote Sensing of the Earth from Outer Space, for example.[36] At the same time, the Charter purpose to serve "population[s]"[37] in situations of "great distress involving loss of human life…caused by a natural phenomenon"[38] and the specific Principles relating to the protection of human life and the environment[39] reinforce each other.

In addition to the legal considerations, it is the view of this author that the one of the most important aspects of the Disasters Charter is that, it is executed by individuals at relatively low levels of government. In the overall scheme of international affairs, they constitute a few small groups of dedicated, motivated, specific, individual, lower-level government employees and decision makers who believe in and are committed to the Charter and its purposes.[40] Attention to Charter activities at the level of heads of ministries and national executives is increasing as was demonstrated by the 2005 Third Earth Observations Summit. There are reasons to be optimistic that this high-level attention will continue to grow, along with the authorization of future resources to carry out the Charter and its purposes. However, in the meantime, this attention is still the exception rather than the rule. On a day-to-day operational level, decisions made by the lower-level government decision makers impact their own departmental or agency resources, rather than budgets at the national level. This is important to keep in mind as the Disasters Charter continues to be activated to meet the exigencies of massive disasters that cause human suffering. Finally, it is also the view of this author that, overall, the Charter is working and will continue to do so with each activation.

[36] G.A. Res. 41, U.N.GAOR, 95th Sess., (1986). Hereinafter Remote Sensing Principles.
[37] Disasters Charter *supra*, note 1, at Article II.
[38] Disasters Charter *supra*, note 1, at Article I.
[39] Remote Sensing Principles, *supra*, note 36, at Principles X and XI.
[40] This view is based on years of interaction with the people at this level and a number of interviews conducted by this author with some of the Charter decision makers from different countries.