

**THE IMPACT OF THE DECLARATION OF LEGAL PRINCIPLES ON THE DEVELOPMENT OF REMOTE SENSING'S INTERNATIONAL LEGAL SYSTEM:
REVISITING THE CONCEPT OF STATE INTERNATIONAL RESPONSIBILITY**

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Introduction

Mankind achieved unprecedented scientific breakthroughs in the 20th Century and stepped into the 21st Century with the necessary tools and expertise to access, via remote sensing, a slew of data on the atmosphere, land surface, oceans, polar regions, and the complex interrelations between the myriad environmental phenomena covering a wide spectrum of time and space coordinates. The importance of such data will be directly dependent on how effectively they are employed toward a sustainable development of the world's ecosystem.

From this developmental perspective, understanding the role that private concerns will play in the domestic and international legal system applying to remote sensing issues is of the essence. This paper aims to provide valuable insights into the legal aspects germane to remote sensing activities of non-governmental entities and a State's International Responsibility for these activities, with emphasis on those that are not in keeping with the precepts set out in Principle IV, *i.e.* the actions that do not abide by the principle of full and permanent sovereignty of all States and peoples over their wealth and natural resources, giving due consideration to the rights and interests of

every State and all entities under its jurisdiction, in keeping with the dictates of international law.

To manage these natural resources, remote sensing by satellite stands out as the most effective means of collecting the data necessary for monitoring and studying environmental phenomena, the more so in nations stretching over a vast expanse of land, as in the case of Brazil. Remote sensing equipment may be mounted onto aircraft, rockets and balloons to obtain images from the Earth's surface, but these platforms are expensive and offer limited operational capabilities. States have resorted to man-made satellites as a platform for remote sensing equipment, and non-governmental entities have increasingly looked to this alternative as well. In fact, a satellite may gravitate around the Earth for quite a while, without the need for fuel and at such an altitude that allows it to capture images covering a large area, repeatedly and at a relatively low cost.

These aspects help explain the pressure that facts have brought to bear on the legal system.¹ After all, technology developments have a material impact on domestic and international law systems, and, in the specific case of remote sensing, several distinct legal systems

may end up governing these activities, in that they may originate from a country's air space (subject to the principles of State sovereignty and, as such, governed by the pertinent domestic laws) or from outer space (subject to the prevailing principles and teleology of *corpus juris spatialis*).² This legal system, whose origin goes back to space-oriented operations during the Cold War period, assumes that there must be peaceful coexistence among the States, for which public international law serves as a common denominator primarily intended to govern space activities of the States worldwide.³

1. Remote Sensing and Outer Space Law

An analysis of the treatment accorded to remote sensing under current space law shows that the ground rules for this issue (*i.e.*, a detailed inventory of the rights and obligations attaching to sensing and sensed States, with focus on the permissibility of such activities, access to collected data, dissemination of data to third persons, or specific uses and legal framework for non-governmental remote sensing activities) are yet to be better defined in international treaties addressing these specific issues.

The Registration Convention and the Outer Space Treaty operate as the international space body of laws applying to remote sensing, with emphasis on the following major (hard law) principles: outer space activities must abide by international law precepts; sovereignty cannot be evoked in relation to outer space; exploration and use of the outer space must target the welfare and interests of all countries in whatever stage of development; all States must be allowed unrestricted access to outer space, on equitable and non-discriminatory conditions; a State's activities in this area must favour peace and international security; international co-operation must prevail; every State must advise the U.N. Secretary-General of the nature of outer space activities, as well as of the place where they will be performed and their ensuing ef-

fects; every State takes international responsibility for outer space activities carried out by its domestic governmental or non-governmental entities; every State where a space object is registered must advise the U.N. of such activities.

Nevertheless, in addition to this legal framework, the U.N. Declaration of Legal Principles has been particularly adopted as a guideline for remote sensing activities, prompting further consideration about the binding nature of such international law mechanisms. Legal writings are split over the legal nature of such international law dictates; some advocate that these principles should be construed as a rule of conduct to be followed by the States (soft law), while others contend that they are closer to a rule of usage and customs materialising into customary law (hard law), with binding force from an international positive law perspective.

In analysing the Principles Relating to Remote Sensing of the Earth from Space, adopted by the U.N. General Assembly in 1986, Gaudrat and Tuinder note that "these principles can now be considered as being a part of customary international space law."⁴

Within this international scenario, the U.N. acknowledged the need of devising new mechanisms for legal protection and regulation of outer space activities, and such task was incumbent on COPUOS.⁵ And the time was ripe for international organisations to come to the fore as new players on the international law stage, with the leading role of conceiving and codifying space law in a way to accommodate new outer space technologies and uses. The Ancient Roman maxim also holds true in this case: *ex facto oritur jus*.

Understanding or coping with space law rules and their complexities, which have a universal reach and are of interest to the international community as a whole, calls for the participation of all States worldwide. In theory, this participation need not necessarily occur via international organisations, but it does materi-

alise within the ambit of such organisations, especially the U.N., whose legitimacy in codifying universal principles derives from the authority bestowed on it by the member States towards the promotion of global peace and development. This legitimacy is also grounded on the U.N. General Assembly's mission of "promoting international cooperation in the political field and encouraging the progressive development of international law and its codification,"⁶ as per Article 13, Paragraph 1(a) of the U.N. Charter.

The COPUOS actions toward the creation of outer space law have had a decisive impact on the progressive development of international law. The first landmark resolutions, containing some principles intended to guide the conduct of States with regard to use and exploration of outer space, served as a prelude to codification efforts in the outer space segment.

According to Prof. Lachs, "even though the U.N. General Assembly Resolutions, in principle, do not stand as law-creating instruments, they may have legal effects when adopted by unanimous decision. And, as such, the binding nature of these Resolutions is unquestionable. However, this fact alone does not release such Resolutions from taking a conventional format."⁷

For Faramiñan-Gilbert, "contemporary legal writings on public international law (drawing on the international experience originated from a massive number of Resolutions adopted by the U.N. General Assembly) tends to acknowledge that rules of conduct, whether adopted by unanimous decision or without valid objections from a legal perspective, should evolve into universal compulsory rules of international law, when developing and codifying certain incipient rules of usage and customs, in accordance with generally accepted principles of public international law and when they are confirmed by the general practice of States."⁸

These legal writings point to a complex interrelation between the formal sources of international law, but do not cast light on how legal mechanisms (of soft law) evolve into positive rules (of hard law), unless this move occurs through the mediation of customary rules or treaties.

In fact, these legal moves directly relate to the categories of international law, but indirectly reflect the economic/political/strategic interests of the myriad players in outer space activities. So far, the general legal framework and specific rule dealing with remote sensing issues is Resolution 41/65 adopted at the U.N. General Assembly, known as "Principles Relating to Remote Sensing of the Earth from Outer Space", which could be viewed as a legal system *in status nascendi* to govern these specific matters.

On 11 December 1986, the U.N. General Assembly approved Resolution 41/65 by unanimous decision. This Resolution consisted of fifteen "Principles on Remote Sensing", which had obtained consensus in the COPUOS.⁹ A pragmatic and theoretical/prospective analysis of this legal instrument is worth consideration at two distinct levels.

Prima facie, our concerns would primarily relate to the legal nature of this international document. The validity of this Resolution rests on the consensus, which represents an intermediary stage in the development of international space law,¹⁰ by laying down the major principles that will govern the deployment of remote sensing activities, and paving the way for the advent of international treaties over this specific issue. In this sense, this Resolution evolves from *de lege ferenda* into *lex lata* when it eventually takes the form of an international treaty. Bin Cheng highlights that "... this instrument took the form of a General Assembly Resolution and not, as was hoped by some States, a treaty, with the result that the principles, instead of being intended to constitute rules legally binding upon those

that subscribe to them, are merely guidelines.”¹¹

This problem was also addressed at the Working Paper on Remote Sensing submitted by Brazil at the COPUOS Forty-Second Session in 2003. “Resolution 42/65, like all documents of the genre, is of a merely advisory nature and does not impose any obligations on States, nor does it meet the need for broad, secure and effective regulations of a strategic space activity for development by all countries. In cases such as this, nothing can replace an international convention, negotiated and approved under the auspices of the U.N. and open to all States.”¹²

Nonetheless, it can be seen that the practice of States under the aegis of these principles builds up a rule of custom and, from this perspective, the principles nurtured in the Resolution become an integral part of customary law.

Secondly, one must look into the effectiveness of this legal mechanism, that is, whether this princiology would actually cater to factual needs and respond to this issue properly. The same Brazilian Working Paper submitted to COPUOS reads that “the only international text in existence on this issue is completely outdated: Principles Relating to Remote Sensing of the Earth from Outer Space (GA Resolution 41/65). This Resolution has been overtaken by the skyrocketing technological advances in the sector that have occurred over the last 16 years. It does not address the question raised today by the multiple satellite sensing programmes, a large number of which are operated by private companies with strictly commercial objectives.”¹³

The Resolution has dubbed certain rules already present in international law. Examples: Principles III (abundance by the Outer Space Treaty); IX (Registration Convention); or XIV (Outer Space Treaty, Article VI on the State’s International Responsibility). However, a closer look at the contents of Resolution 41/65 unveils the frailty of these princi-

ples vis-à-vis the wide spectrum of uses for remote sensing activities that are being developed, coupled with the sheer lack of a legal framework for remote sensing activities deployed by non-governmental entities. In defining ‘remote sensing’, Principle I limits the applicability of such mechanism to those activities intended to improve the management of natural resources, use of land, and environmental protection. Other uses are still devoid of legal protection.¹⁴

In implicitly admitting the extraterrestrial nature of outer space rules of law, Principle III notes that remote sensing activities must abide by the precepts of international law, including the U.N. Charter, the Outer Space Treaty, and documents pertaining to the International Telecommunications Union.

Principle IV, which refers to the rights and interests of sensed States, embodies the teleology of Article I of the Outer Space Treaty by furthering its legal structure when making express reference to the principle of full and permanent sovereignty of all States and peoples over their wealth and natural resources, clearly tipping the scales in favour of the rights and interests of all States and entities under their jurisdiction, for it is defended that remote sensing activities cannot be deployed in detriment to the rights and interests of sensed States. For Cheng, this principle “sounds like an application of the principle of good neighbourliness.”¹⁵

For Christol, the reference to full and permanent sovereignty of the States over their natural resources shows that “... a major contest requiring resolution resulted from the views held on the one hand by States favouring international co-operation in the acquisition and dissemination of the product of remote sensing, and on the other by countries which emphasised the role of national sovereignty with its focus on the national privacy.”¹⁶ This approach sides with the principle of permanent sovereignty of States over their natural resources, a concept that made its debut in the U.N. General Assembly in 1952, and then

ratified in a number of subsequent resolutions.¹⁷ This concept is reaffirmed by the teleology applying to the new world order in the economic scenario, originally conceived in the 1970s¹⁸ and materializing into Principle 2 of the Rio de Janeiro Declaration on the Environment and Development of 1992, when it was viewed as an essential element for the development of States.¹⁹

On the other hand, the Resolution acknowledges the freedom of remote sensing activities, as one particular manifestation of the freedom of space activities subject only to international law, as Principle IV expressly stipulates that remote sensing activities must be deployed in strict abidance with the precepts spelled out in Article 1 of the Outer Space Treaty. According to this international rule, outer space may be freely used and explored by all States, on an equitable and non-discriminatory basis pursuant to international law.

Principle IV has stirred up a great deal of controversies and paradoxes by establishing two antipodal concepts: freedom of remote sensing and the sovereignty and rights of the sensed State, on the one part, and the legitimate rights and interests of any State and its entities, on the other. Although adopting the concept of full and permanent sovereignty of the State over its natural resources, Principle IV does not change the fact that the sensed State has no veto rights to prevent it from being sensed, or even an exclusive or preferential right of access to ensuing data. Principle XII only provides the sensed State with a right of access to primary and processed data concerning the territory under its jurisdiction, on a non-discriminatory basis and at a reasonable cost.

Principle XIV (which is of fundamental importance, in that it directly relates to international responsibility of the State for outer space activities deployed by governmental or non-governmental entities) draws on a rule of conventional law when adopting the teleology of Article 6 of the Outer Space Treaty and

highlighting the applicability of international law rules to the responsibility of States for remote sensing activities.²⁰

2. International Responsibility of the State and Remote Sensing

International responsibility of States, originating from customary law principles, has come under scrutiny by the U.N. International Law Commission (ILC), which prepared the Draft Articles on Responsibility of States for Internationally Wrongful Acts.²¹

2.1. 'Responsibility' and 'Liability'

The term 'responsibility' means primary accountability. The obligation to answer for an act done and to repair or otherwise make restitution for any injury it may have caused.²² In case of breach of a legal rule causing damage to another, legal responsibility entails a legal obligation incumbent on the author of the breach to make full reparation to the victim for the damage. 'Liability' represents merely one aspect of responsibility, and a consequence of responsibility in case the person responsible breaches an obligation that is incumbent upon it and, in doing so, causes damage to another. Under the Brazilian law system, 'responsibility' must apply to cover the two legal aspects discussed above.

The ILC has endeavoured to clarify the concept of responsibility: "...the term 'responsibility' should be used only in connection with internationally wrongful acts..."²³ This is central to the concept of State's responsibility. Article 1 of the ILC Draft Articles reads that "every international wrongful act of State entails the international responsibility of that State." Article 2, in turn, defines the elements of an internationally wrongful act: "there is an internationally wrongful act of State when conduct consisting of an action or omission is attributable to State under international law and constitutes a breach of an international obligation of State."

Therefore, a legal framework is necessary to characterise an act as 'wrongful' under international law. However, if this characterisation takes the form of a U.N. Resolution, the impact of a rule of this nature could produce a state of affairs in which the sensed State *per se* may be harmed.²⁴ Nonetheless, regulating this issue under current international customary law does not suffice.²⁵ The development of an international conventional on remote sensing is necessary for the updating of the Principles Relating to Remote Sensing and for the development of rules relating to new situations.

3. Legal aspects of the activities developed by non-governmental entities

States hold international responsibility for the outer space activities conducted by private individuals and entities within their jurisdiction, as well as by government entities.²⁶ The extent to which States should be held responsible for the remote sensing activities deployed by private players is an increasingly significant contemporary issue. Applicable rules are defined in ILC Draft Articles 4 through 11, through rules of "attribution" which indicate when an act should be regarded as an act of State. For Bodansky, "these rules are generally traditional and reflect a codification rather than any significant development of the law."²⁷

Article 5, in turn, is thus worded: "the conduct of a person or entity which is not an organ of State under Article 4 but which is empowered by the law of that State to exercise elements of the governmental authority shall be considered an act of the State under international law, provided that the person or entity is acting in that capacity in the particular instance." Article 8 reads that "the conduct of a person or group of persons shall be considered an act of a State under international law if the person or group of persons is in fact acting on the instructions of, or under the direction or control of, that State in carrying out the conduct." These rules are the first, tentative steps toward the development of a legal

system that will rest on States the responsibility for private conduct or for the composite governmental/non-governmental activities. However, doubts still remain over such major themes as the accurate meaning of being "under a state direction or control,"²⁸ or the system to be specifically adopted by the State for control and surveillance purposes.

In fact, no legal framework has been devised to govern remote sensing activities performed by non-government entities within the realm of conventional international law, whereupon the system envisioned in the Outer Space Treaty still applies. Within this perspective, private entities will be allowed to engage in remote sensing activities only under the authorisation and ongoing supervision by the State with jurisdiction over them. And the State will thus take direct responsibility for such activities. This state of affairs urges the development of domestic laws to govern this specific issue.

The interpretation on the extent of a State's responsibility for activities undertaken by non-governmental organisations based on the criteria of State's direction or control creates a paradoxical situation in which political and strategic influences may come into play, thus interfering in the characterization of the activity as being or not under the State's control.

According to Pamela Meredith, "the few States that have authorised private space activities to date have tended to consider it an internal matter for sovereign nations to determine what form the authorisation and supervision should take... Licensing regimes for private space activities that are much more rudimentary and general in nature exist in a few other countries."²⁹

This international legal context gives us a glimpse of the complexities underlying this issue, and of the pressing urgency to prepare a multilateral international treaty whose effects on domestic laws may trigger the harmonisation of licensing standards, control and supervision patterns, security and safety measures,

and other criteria germane to limitation of compensation and the legal status of private enterprise.

4. The Brazil Experience

In Brazil, the legal framework for remote sensing issues is at the *de lege ferenda* stage, meaning that the concerted efforts of the Ministry of Defence, Ministry of Science and Technology, and Brazilian Space Agency culminated in a Bill on air and space sensing regulations, already submitted for congressional review by the Executive Branch, as per Message No. 1248 of 8 September 2000.³⁰ Nevertheless, this bill is under discussion, and its original intent might still undergo substantial changes.

Article 4 of the Bill reads as follows: "Space sensing means the set of operations involving the reception, registration, processing, interpretation, treatment or distribution of data in any way on the land, air or maritime areas of the Brazilian territory, as well as on Brazilian jurisdictional waters, based on sensors or equipment mounted onto space platforms." This concept of remote sensing is all-too-general, making it difficult to bring it into practice or monitor the activities covered by it.

Under article 13 of this Bill, it will be incumbent on the Brazilian Space Agency: (1) to control and supervise space sensing throughout the Brazilian territory; (2) to lay down rules and to issue authorisations for remote sensing equipment made in Brazil or acquired abroad, when it enters the country; (3) to review and approve protocols involving remote sensing-related activities, to be entered into between Brazilian governmental or non-governmental entities and foreign governmental bodies or entities.

Such incumbencies are intended, among other factors, to protect certain strategic or defence interests within the Brazilian territory; to define title to and responsibility for safekeeping, maintenance of technical quality, and control

of products originated from remote sensing activities; to keep domestic entities up-to-date with remote sensing know-how and expertise; and to prepare the National Remote Sensing Record.

In terms of international relations, it is worth mentioning the Working Paper submitted to COPUOS, at the 42nd Session of the Legal Subcommittee,³¹ by Argentina, Brazil, Chile, Colombia, Cuba, Ecuador, Greece, Mexico and Peru, concerning the proposal for a new agenda item on the regulation of remote sensing by satellite. The core of this proposal is to include a discussion on the development of an international convention on remote sensing, taking the following key factors into consideration:³² (1) satellite remote sensing activities are currently insufficiently regulated from the international point of view; (2) satellite remote sensing activities are now indispensable and must be regulated by a broad, compulsory and universally acknowledged instrument; (3) many satellite remote sensing activities are not yet subject to international regulation; (4) it is necessary to regulate satellite remote sensing activities with the precautions required by an international public service that is essential to the global community; (5) the regularity and predictability of the remote sensing services by satellite must be guaranteed; (6) a basic international legal system must be formulated for the growing commercialisation of satellite remote sensing activities; (7) appropriate regulations are needed, guaranteeing not only the right of commerce, but also the right to access; (8) fundamental concepts must be defined in a clear and detailed manner, filling in the significant gaps that exist today; (9) responsibilities must be established for the use of remote sensing data, especially in relation to sensed States; and (10) coherence, harmony and effectiveness should be lent to the principles and norms regarding satellite remote sensing activities, in order to prevent contradictory interpretations.

Within the realm of bilateral international relations and co-operation in space activities,

particularly concerning the exploitation of Earth observation techniques, Brazil and China established the China-Brazil Earth Satellite Programme (CBERS),³³ creating a true *corpus iuris spatialis specialis* comprising 14 bilateral agreements to govern remote sensing activities, adopting the principiology and teleology of international legal instruments prepared under the umbrella of COPUOS, and also drawing on contemporary international law.

Conclusions:

(1) The contemporary State takes upon itself the responsibility for preserving its environmental resources and ensuring an effective and sustainable development of such environment, observing the following principles, among others: (1) full and permanent sovereignty of all States and peoples over their wealth and natural resources, giving due consideration to the rights and interests of every State and entities under its jurisdiction, in keeping with international law precepts; (2) good neighbourliness; (3) prohibition against cross-border pollution; (4) mutual assistance and co-operation; (5) reciprocal treatment; (6) transfer of technology; (7) information; (8) non-interference in a State's domestic affairs; (9) equal sovereignty of the States; and (10) international responsibility of the State, with the consequent obligation to redress any damage caused by it.

(2) The legal and regulatory framework currently dealing with remote sensing activities is U.N. Resolution 41/65, titled "Principles Relating to Remote Sensing of the Earth from Outer Space", which stands as a legal system *in statu nascendi* to govern this issue. Court precedents and legal writings on the binding nature of U.N. Resolutions point to a complex interrelation among formal sources of international law, making evident that it is still uncertain how legal mechanisms acting as soft law evolve into positive rules of hard law, unless this evolutionary movement is mediated through customary law or treaties. In fact, these legal moves are directly related

to international law categories, but indirectly reflect the economic, political and strategic interests of the several players in the space segment.

(3) Remote sensing activities developed by non-governmental entities have not been accorded a specific treatment in the form of conventional international law, which has left them dependent upon the Outer Space Treaty and its precepts until today. In this sense, private entities will only be allowed to engage in remote sensing activities under an authorisation and ongoing supervision of the State with jurisdiction over them. As a result, the State takes direct responsibility for such activities. This state of affairs has lent urgency to the development of domestic rules to govern this specific matter.

(4) The interpretation of the extent of a State's responsibility for activities undertaken by non-governmental organisations based on the criteria of State's direction or control creates a paradoxical situation in which political and strategic influences may come into play, thus interfering in the characterisation of the activity as being or not under the State's control.

(5) Principle IV of the Declaration of Principles on Remote Sensing has aroused a great deal of debates and conflicts by bringing two antipodal concepts together, namely: the freedom of remote sensing activities, on one part, and the sovereignty and rights of the sensed State, on the other, as well as the legitimate rights and interests of any State and its entities. Albeit acknowledging the concept of a State's full and permanent sovereignty over its own natural resources, this principle does not change the fact that the sensed State has no veto rights to prevent it from being sensed or even an exclusive or preferential right of access to ensuing data. Principle XII only provides the sensed State with a right of access to primary and processed data relating to the territory under its jurisdiction, on a non-discriminatory basis and on reasonable cost terms.

(6) A matter of central importance, in that it directly relates to a State's international responsibility for activities performed by governmental or non-governmental entities in outer space, Principle XIV embodies a conventional positive law rule by adopting the teleology of Article 6 of the Outer Space Treaty and emphasising the applicability of international law rules to a State's responsibility for remote sensing activity. laws.

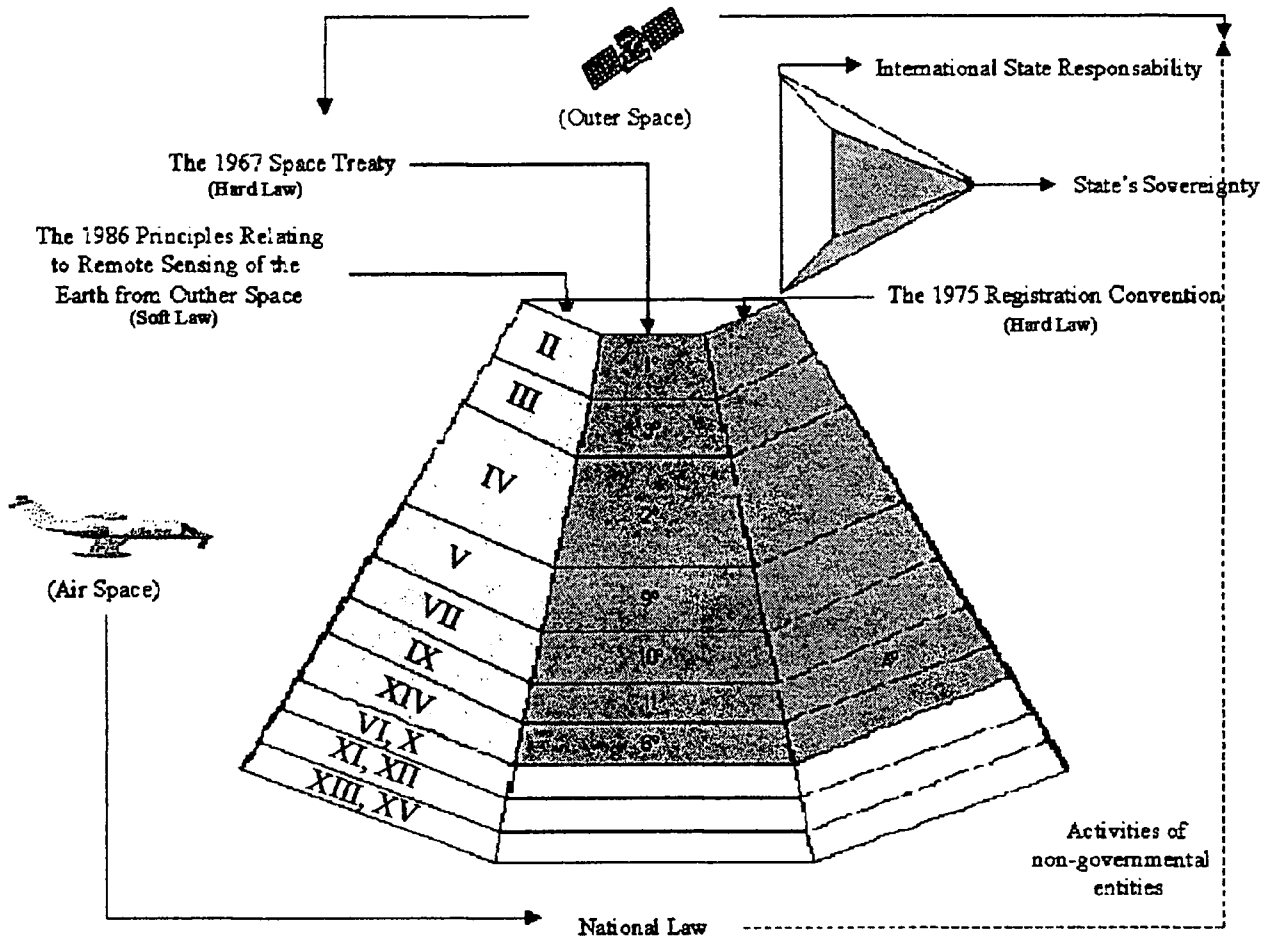
[7] The attached chart portrays the impact of remote sensing activities on the Earth's ecosystem and, consequently, on the international legal system, which is still at the early *status nascendi* stages. This reflects the pressure that facts bring to bear on the legal system. Bin Cheng properly questions: "Arrival

of Space Age: Roof Ripped Off the Castle?" In fact, Pandora's box has been opened, and the international community must be ready to cope with surprises arising from remote sensing activities, as well as from domestic legal systems. Thus the drafting of an international treaty on remote sensing, which will take into account the interests of both developed and developing countries, has become urgent.

Remote Sensing and Space Law

"Arrival of the Space Age: Roof ripped off the castle?"

Bin Cheng



II - Special needs of developing countries

III - Respect of IL, UN Charter, Space Treaty, ITU

IV - Freedom of outer space. Respect to the other States' sovereignty over resources and their rights and interests

V - Opportunity for participation

VII - Technical assistance

IX - UN Secretary-General to be kept informed

XIV - International responsibility of the State

VI - Co-operation in data collection

X - Promote environmental protection

XI - Promote information regarding natural disaster

XII - Dissemination of primary data and analysed information to sensed State

XIII - Interests of sensed State

XV - Settlement of Disputes

Notes

¹ See, VISSCHER, Charles de. *Théories et Réalités en Droit International Public*, 4 ed., Pedone, Paris, 1970.

² See chart prepared by Christiano Sadock, engineering student at ITA, Brazil, p. 10 of this paper.

³ According to Wassenberg, "present international outer space law is becoming obsolete, or at least totally inadequate, partially because it is based on the assumption that only states are to deploy space activities, or that space activities always have to come, in all respects, under the responsibility and liability of states, states being the only subjects of international outer space law. Only states enjoy the freedom of exploration and use of outer space (art. 1, second paragraph of the OST)." WASSENBERG, Henri. *The Law of Commercial Space Activities*, in *Outlook on Space Law over the Next 30 Years*, Kluwer Law International, The Netherlands, 1997, p. 173.

⁴ GAUDRAT, Philippe, and TUINDER, Paul H. *The legal status of remote sensing data*, in *Outlook on Space Law over the Next 30 Years*, Kluwer Law International, The Netherlands, 1997, p. 353.

⁵ CHENG, Bin. *Studies in International Space Law*, Clarendon Press, Oxford, 1997, pp. 91-211; JASENTULIYANA, N. *The United Nations: Its Role in the Progressive Development on Space Law*, in *Proceedings, 8th ECSL Summer Course on Space Law and Policy*, University of Geneva, Switzerland, 1999, pp. 8/19; RANGEL, V. Marotta. *Codificação do Direito Espacial*, in *Revista Brasileira de Direito Aeroespacial*, 1995, pp. 2/7; UN Doc A/AC.105/358, in *ECSL Space Law and Policy Summer Course*, Martinus Nijhoff Publishers, 1993, pp. 12/26.

⁶ RANGEL, *op. cit.*, p. 3.

⁷ *Apud* FARAMINIAN-GILBERT, Juan Manuel. *Les Résolutions des Nations Unies sur le Droit de L'Espace*, in *ECSL Space Law and Policy Summer Course*, Martinus Nijhoff Publ., 19194, p. 15.

⁸ FARAMINIAN, *op. cit.*, pp. 6/7.

⁹ CHRISTOL, Carl. *Space Law - Past, Present, Future*, Kluwer Law and Taxation Pub., the Netherlands, 1991, pp. 73/95.

¹⁰ CHENG, *op. cit.*, p. 199.

¹¹ *Id.*, p. 590.

¹² Working Paper submitted by Brazil – *Why is an international convention on remote sensing of the Earth from outer space necessary?*. COPUOS, Legal Subcommittee, Forty-second session, Vienna, 24 March – 4 April, agenda 9, Proposal to the COPUOS for new items to be considered by the LS, A/AC.105/C.2/L.244, p. 2.

¹³ *Id.*, p. 1.

¹⁴ "Resolution 41/65 does not mention the use of remote sensing for the observation, reconnaissance and monitoring of productive areas (relating to agriculture, cattle, fishing and industry), transportation infrastructure (such as highways, railways, ports and airports) or services (meteorological and tourism), nor for the verification of compliance with international treaties...None of those activities, of clear economic and strategic relevance, is governed by specific international regulations. This constitutes an unjustifiable legal vacuum which may cause serious harm to numerous countries, especially least developed countries." In Working Paper by Brazil, *op. cit.*, p. 2.

¹⁵ CHENG, *op. cit.*, p. 500. This is also the stance taken at the Working Paper by Brazil at COPUOS, *op. cit.*, pp. 4/5.

¹⁶ CHRISTOL, *op. cit.*, p. 75.

¹⁷ Resolution 523 (VI) of 1952; Resolution 626 (VII) of 1952; Resolution 1803 (XVII) of 1962; Resolution 2158 (XXI) of 1966; Resolution 3201 (S-VI) of 1974; Resolution 3281 (XXXIX) of 1974; among others.

¹⁸ In *Texaco v. Libya*, arbitrator Dupuy held that the principle of permanent sovereignty does not allow a State to strip itself or dispose of its sovereignty rights over natural resources, but gives no leeway to acceptance of an agreement that partially limits the exercise of such sovereignty over some resources within a certain area and for a determined period. See JO, Hee Moon. *O Investimento Estrangeiro e o Novo Papel do Direito Internacional*, Ph.D. dissertation, FADUSP, São Paulo, 1991, p. 104.

¹⁹ ROLIM, Maria Helena Fonseca de Souza. *A Tutela Jurídica dos Recursos Vivos do Mar na Zona Econômica Exclusiva*, Max Limonad, São Paulo, Brasil, 1^a ed., p. 80.

²⁰ See CHENG, *op. cit.*, pp. 596/7. Christol, in turn, notes that "... the double reference to condition of responsibility is based on historical differences. The term "State" responsibility antedates the space age. "International" responsibility is an important provision of art. 6 of the 1967 Principles Treaty. The former traditionally has protected an alien against the wrongful conduct of natural persons of the country in which he is situated, as well as against the wrongful conduct of natural and juridical persons in that country. The latter, while also dealing with the conduct of a foreign State and its natural and juridical persons, has been designed to secure protection against activities occurring in outer space, including the consequences of such activities in outer space, in air space, and on the surface of the Earth." *Op. cit.*, p. 235.

²¹ Report of the ILC on the work of its Fifty-third session. Official Records of the General Assembly, Fifty-sixth session, Supplement N. 10 (A/56/10), chp. IV.E.I). November 2001.

²² CHENG, *op. cit.*, p. 603. *Black's Law Dictionary*, 6th ed., West Publishing CO. 1990, p. 1312.

²³ CHRISTOL, *op. cit.*, p. 237.

²⁴ Christol notes that "it could be assumed that an alien purchase the end product of remote-sensing activity, known as 'analysed information'. If it could be assumed that the analysis of either the primary (raw) data or the processed data, which consist of the products resulting from the processing of the primary data, where conducted in a negligent manner (or where intentionally misrepresented), and if this were treated as an internationally wrongful act, and further, if the alien purchaser of the analysed information used it to its detriment, the international legal principle of State responsibility would become relevant", *op. cit.*, p. 241.

²⁵ "It is not sufficient to accept as international customary practice the freedom to sense the entire world and the freedom to sell the products of such sensing, which, in fact have never been disputes by any country since resolution 41/65 was approved.National restrictions on access to data are emerging... The commercial interest should be respected and even stimulated, but cannot supersede public interest..." in Brazilian Working Paper, *op. cit.*, p.3.

²⁶ Outer Space Treaty, Art. VI. MEREDITH, Pamela et al. *Space Law: A Case Study for the Practitioner*, MNP, Netherlands, 1992, p.42.

²⁷ BODANSKY et al. *The ILC's State Responsibility Articles – Introduction and Overview*. *The American Journal of International Law*, Vol. 96:773, p. 783.

²⁸ "Important international tribunals have approached these question in quite different ways", *op. cit.*, p. 785.

²⁹ MEREDITH, *op. cit.*, p. 44.

³⁰ See, MUSSI, Raimundo. *O Sensoriamento Remoto e sua Regulamentação*. in *Revista Brasileira de Direito Aeroespacial*, n. 86, June 2003, pp. 8/11.

³¹ Vienna, 24 March-4 April 2003, Agenda item 9, Proposals to the COPUOS for new items to be considered by the LS at its forty third session. A/AC.105/C.2/L.245.

³² *Id.*

³³ See MONSERRAT FILHO, José. *Brazilian Chinese Space Co-operation*, in *Revista Brasileira de Direito Aero-espacial*, Brazil, n. 71, pp. 3/14. 1997. 39 ICLOS, Beijing, China, 1996.