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DEVELOPING A SPACE INDUSTRY IN COSTA RICA: LAYING THE BASIS FOR A POLICY AND LEGAL FRAMEWORK

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"Our nettlesome task is to discover how to organize our strength into compelling power."

Dr. Martin Luther King, JR.[2]

RESUMEN: Este artículo pretenden sentar las bases para la creación un marco legal y de políticas públicas que permita el desarrollo comercial de la industria aeroespacial en Costa Rica. Se utiliza una perspectiva doctrinaria y de *lege ferenda*. En este tanto, en la primera parte se establecen de forma sucinta aspectos fundamentales para la elaboración de un marco legal. Introduce el actual marco normativo internacional del espacio exterior, particularmente tres de los cuatro tratados preparados y negociados por la Organización de Naciones Unidas, y adoptados por su asamblea general. En particular se analizan algunas de las obligaciones esenciales en cuanto a la responsabilidad estatal y no estatal derivada de las actividades en el espacio exterior. Desde la perspectiva de *lege ferenda*, en la segunda parte se aborda la necesidad de adaptar el marco normativo nacional a las regulaciones internacionales. Finalmente se hace un repaso histórico de las políticas de comercialización de la industria aeroespacial en Estados Unidos como ejemplo de políticas claras y regulares de desarrollo de la materia.

PALABRAS CLAVE: Derecho aeroespacial, industria aeroespacial, comercio internacional, derecho internacional.

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2 Martin Luther King, Jr. "Black Power Defined", *New York Times Magazine*, June 11, 1967, cited in Makani N. Themba, *Making policy, making change : how communities are taking law into their own hands* (Berkeley, CA: Chardon Press, 1999) at 81.

ABSTRACT: This paper attempts to lay the basis for the creation of a legal and policy framework for the development of commercial space industry in Costa Rica. The approach will be doctrinal and reform orientated from a Costa Rican perspective. To that end, its first part briefly establishes some of the fundamental considerations towards the elaboration of a legal framework. It introduces the current international legal regime over outer space, particularly, three of the five treaties prepared and negotiated within the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) and adopted by the United Nations General Assembly. In particular, some of the essential obligations related to State's international responsibility and liability for non-governmental activities in outer space will be analyzed. In addition, using the aforementioned doctrinal and reform orientated approach, the issue of the national implementation of the international legal framework is addressed. In its second part, the need for a policy framework is reviewed. An historical overview of the commercialization policies in the US is offered as a clear example of the significance of clear and continued policies for the development of a commercial space industry.

KEYWORDS: Space Law, space industry, international commerce, international law.

INTRODUCTION

The commercial space industry is entering an unprecedented age of growth with no signs of letting-up. It appears to have gained momentum and is more promising than ever before. In that regard, the 2010 Space Security report confirmed that the "[c]ommercial space revenues have steadily increased since the industry first started to

grow significantly in the mid-1990s. From satellite manufacturing and launch services to advanced navigation products and the provision of satellite-based communications, the global commercial space industry is thriving, with estimated annual revenues in excess of $200 billion"[3]. Similarly, the 2011 Space Economy report states that "[t]he space economy continued to grow for the fifth year in a row, seemingly unaffected by the economic turmoil that brought losses to many other industries during the height of the recession. (…) The space economy increased by nearly $20 billion during 2010, reaching an estimated total of $276.52 billion".[4]

Whilst the commercial space boom continues, an increasing number of emerging players such as China, India and Brazil are authorizing significant space budgets for the development of local space technologies and related-infrastructure, helping to globalize the commercial space industry[5]. According to the 2010 Space Security Index, the "rate at which new states gain access to space (…) is expected to continue increasing as launch costs decrease and some states indigenously develop space technologies".[6] In fact, multinational companies are facilitating the emergence of new players by establishing operations in the so-called 'non-space-faring' nations *i.e.* countries lacking capability and expertise to access outer space using their own indigenous space systems. Consequently, more and more countries are now facing the challenge of promoting and regulating the development of a space industry driven by the private sector. Costa Rica is, indeed, an excellent example of the foregoing.

In 2005, Ad Astra Rocket Company, a U.S. spaceflight engineering company led by Costa Rican scientist and former U.S. astronaut, Dr. Franklin Chang-Díaz, currently dedicated to the development of advanced plasma rocket propulsion technology known as the 'Variable Specific Impulse Magnetoplasma Rocket' (VASIMR®) and associated technologies, established a wholly owned subsidiary in the city of Liberia, Costa Rica.[7] The longstanding idea of Dr. Chang-Díaz has been, and continues to be, to launch Costa

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3 Space Security Index Project, "Space Security Index Report 2010" (2010) online: Space Security Index <http://www.spacesecurity.org/space.security.2010.reduced.pdf> at 31. [2010 Space Security Index].
4 Space Foundation, *The Space Report 2011: The Authoritative Guide To Global Space Activity* (Washington, DC: Space Foundation, 2011) at 35. [hereinafter the "2011 Space Economy Report"].
5 See generally Space Foundation, 2011 at 47-57.
6 Space Security Index at 19.
7 See Ad Astra Rocket Costa Rica, online: < http://www.adastrarocket.com/aarc/AdAstraCostaRica>

Rica into the seemingly inaccessible space industry. Pursuant to his dream, Dr. Chang-Díaz, along with a group of space enthusiasts, started to promote, in conjunction with the Costa Rican government, academia and the private sector, the idea of developing a space industry in Costa Rica.

Realizing the multiple social and economic benefits that the development of a space industry can bring not only to Costa Rica but to the Central American region, the Costa Rican government established a national council called *Consejo Nacional de Investigación y Desarrollo Aeroespacial* ("CONIDA") ['National Council of Aerospace Research and Development'] in 2010. CONIDA consist of a number of institutions and organizations whose mandate is to design the necessary policies to promote the development of an aerospace industry[8].

The Costa Rican government has also expressed its interest in developing a cluster of aerospace companies and in promoting the participation and cooperation of other countries in Central America in the development of space technologies with the support of the Secretariat for Central American Integration ("SICA").

In stark contrast to the abovementioned efforts, Costa Rica lacks a legal and policy framework supporting the development of a commercial space industry. In fact, this paper argues that no substantial progress will be achieved in Costa Rica without a clear legal and policy framework providing not only direction and content for lawmaking, rulemaking and implementation thereof, but most importantly, ensuring continuity to initiatives and programs through subsequent governments.

In light of the above, this paper attempts to lay the basis for the creation of a legal and policy framework for the development of commercial space and aerospace industry in Costa Rica. The approach will be doctrinal and reform orientated from a Costa Rican perspective.

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8 Executive Decree 36102-RE-MICIT, 25 July 2010. See generally Global Legal Information Network, GLIN online: <http://www.glin.gov/view.action?searchDetails.searchAll=true&summaryLang=es&glinID=237907&searchDetails.queryString=subterm%3Aequals%28%22en+Aviation%22%29&searchDetails.hitsPerPage=10&fromSearch=true&refineQueryType=BOOLEAN&refineQuery=subterm%3Aequals%28%22en+Space+law%22%29&refine=&searchDetails.sortOrder=rank&searchDetails.queryType=BOOLEAN&searchDetails.showSummary=true> [in Spanish].

To that end, its first part briefly establishes some of the fundamental considerations towards the elaboration of a legal framework. It introduces the current international legal regime over outer space, particularly, three of the five treaties prepared and negotiated within the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) and adopted by the United Nations General Assembly. In particular, some of the essential obligations related to State's international responsibility and liability for non-governmental activities in outer space will be analyzed. In addition, using the aforementioned doctrinal and reform orientated approach, the issue of the national implementation of the international legal framework is addressed.

In its second part, the need for a policy framework in Costa Rica is reviewed. An historical overview of the space commercialization policies in the US is offered as a clear example of the significance of clear and continued policies for the development of such industry.

It has been commonly stated that Costa Rica lacks a legal framework to support the development of a commercial space industry. This legal vacuum might be related – at least in part – to the fact that it has not needed one until now. As Dr. Hermida clearly states, "[t]he emergence of a private space industry in an increasing number of States calls for [an] adequate domestic legal framework to regulate its complex and sophisticated commercial endeavors in outer space".[9]

This section attempts to lay the basis for the creation of a legal framework for the development of a commercial space in Costa Rica. The purpose of this part is neither to draft a bill nor to comprehensively address all issues involved in making such a framework, but rather to examine some of the main aspects so as to establish an initial frame for a more detailed analysis in future studies. For the purposes of this study, a 'legal framework' is understood as a system of international and national rules and procedures that is implemented for regulating certain activities, whether carried out by either governmental or non-governmental entities.

9 Julian Hermida, *Legal basis for a national space legislation* (Thesis, 2003) at 275 [unpublished].

There are many reasons to justify the need for a legal framework. Among the most important are:

(i) the convenience for Costa Rica to comply with the obligations and duties imposed by international law, in particular with the international space law, affirming the country's commitment to the rule of law. The rule of law is understood here as:

> "[A] principle of governance in which all persons, institutions and entities, public and private, including the State itself, are accountable to laws that are publicly promulgated, equally enforced and independently adjudicated and which are consistent with the international human rights norms and standards. It requires, as well, measures to ensure adherence to principles of supremacy of law, equality before the law, fairness in the application of law, separation of powers, participation in decision-making, legal certainty, avoidance of arbitrariness and procedural and legal transparency".[10]

As indicated by Wallace and Martin-Ortega, "[s]tates want to be seen to be adhering to international law: why otherwise do they go to considerable efforts to justify their particular position in international law?"[11]

(ii) the convenience for Costa Rica to provide both public and private players with as much 'legal certainty' as possible. As stressed in the 2011 Space Report, "[a] stable business environment, underpinned by clearly codified legal guidelines and regulatory transparency, is essential for the successful development of commercial space products, services, and spinoffs".[12]

A 'national legal framework' for the regulation of space activities will essentially have both an international and domestic dimension. At the international dimension,

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10 Report of the United Nations Secretary General on the Rule of Law and Transitional Justice in Conflict and Post-Conflict Societies 2004. UNSG Report S/2004/619 p. 4 cited in Per Bergling, *Rule of law on the international agenda : international support to legal and judicial reform in international administration, transition and development co-operation* (Antwerpen: Intersentia, 2006) at 17.

11 Rebecca M. M. Wallace & Olga Martin-Ortega, *International law* (London: Sweet & Maxwell, 2009) at 4.

12 Space Foundation, at 29.

considering that the commercial space activities are international by nature, a 'legal framework' will need to address the question of international law. To address such question, the first part briefly analyzes what the current international law is, and in particular, what the international space law is; that is, its scope of application and its relevance for the development of a commercial space industry. At the domestic level, a 'legal framework' will need to address *inter alia* the question of the implementation of international law, in particular, of the body of international space law. To that end, the second part analyses how international law becomes applicable in Costa Rica and whether Costa Rica requires further national legislation for the implementation of its obligations under international space law.

A. INTERNATIONAL DIMENSION

1. General Considerations on the International Legal Framework

To begin with, it is important to define what is understood as 'international law'. According to Wallace and Martin-Ortega, 'international law' refers to "that body of rules which regulates the relations of States and also the relations of those other entities which are [recognized] as possessing international personality or at least a measure of international personality at any given time".[13]

This begs the question of what is meant by international personality. Dr. Bin Cheng, the late emeritus professor of air and space law, clarifies that "international legal personality means the capacity to bear rights and duties under international law. Non-international persons may have benefits and burdens indirectly conferred or imposed on them, but they have no direct legal rights or obligations under international law".[14] Within international law, a large number of instruments apply to the uses of the outer space and space-related activities. This body of rules is commonly referred as to 'international space law' or *corpus juris spatialis*, and it is generally considered to be formed by the set of five treaties and five declarations of principles drafted within the United Nations Committee

13 Wallace & Martin-Ortega, at 3.
14 Bin Cheng, *Studies in international space law* (Oxford; New York: Clarendon Press ; Oxford University Press, 1997) at 173.

on the Peaceful Uses of Outer Space ("UNCOPUOS") [15] and adopted by the United Nations General Assembly. [16]

Nevertheless, as clarified by Dr. Cheng, "space law, as it now exists, is not an independent legal system. It is merely a functional classification of those rules of international law and or municipal law relating to outer space, natural or man-made objects in outer space, spacemen, and man's activities in outer space".[17] It is worthwhile to note that Dr. Cheng has a unitary conception of space law which encompasses both international and municipal law. To this extent, Dr. Cheng's view on the relationship between national law and international law appears to subscribe to the monist school. Monism and dualism have been the most persistent theories proposed by scholars to explain the relationship between international and national law.[18] As explained by E. Denza,

> "[i]n the view of the monists, there is a single legal system with international law at is apex and all national constitutional and other legal norms below it in the hierarchy. There is no need for international obligations to be 'transformed' into rules of national law, and in case of any apparent conflict, the international rule prevails. The fact that national organs do not behave according to such rules indicates the weakness of international law, but does not invalidate the theory, since the State will incur international responsibility where it permits violations of international legal rules to occur. (…) Under the dualist theory, international law and national law operate on different levels. International law is a horizontal legal order based on and regulating mainly the relations and obligations between independent and theoretically equal sovereign States. (…) If the international rule confers rights or obligations on individuals or entities created under national law, the

15 UNCOPUOS has been an important international forum for the development of laws and principles governing outer space since 1958. See generally http://www.unoosa.org/oosa/en/COPUOS/cop_overview.html

16 See United Nations Treaties and Principles on Space Law, online: Office for Outer Space Affairs < http://www.unoosa.org/oosa/en/SpaceLaw/treaties.html>

17 Cheng, *supra* note # 13 at 383.

18 Malcolm D. Evans, *International law* (Oxford; New York: Oxford University Press, 2010) at 417. [*International law*].

national legislature may 'transform' it into a rule of national law, and the national judge will then apply it as a rule of national, or domestic law".[19]

Moreover, it is important to bear in mind that neither theory is more valuable than the other, as States are nevertheless under an obligation to perform their international obligations, and they cannot invoke domestic law as a justification for non-fulfilment.[20]

In the author's opinion, considering the international nature of space activities and the current world of globalized economies, 'international space law' or simply 'space law' should be seen from a monistic perspective, as a host of international and national rules that are integral parts of the same system. States and non-governmental entities should look beyond the body of international law when dealing with outer space matters. Laws and regulations of other States governing space-related activities could have an extraterritorial application or – at least – have effect on their space activities. For instance, domestic laws regulating satellite broadcasting activities will determine whether it is allowed to broadcast without previous license or authorization.

According to the above, the *corpus juris spatialis* or space law should be understood *lato sensu* as comprising (a) the international law, including but not limited to the set of five multilateral treaties elaborated by the UNCOPUOS' legal sub-committee, all of which have entered into force and are binding instruments among Member States; (b) the set of five United Nations General Assembly's resolutions and any other related 'soft-law' or non-binding written instruments such as codes of conduct, memorandums of understanding or guidelines; (c) constitution instruments, agreements, conventions, guidelines and regulations of international organizations related to outer space activities (*e.g.,* the Convention and Constitution of the International Telecommunications Union, as well as the Radio Regulations adopted therein); (d) national policies, laws and regulations, executive and/or administrative orders or directives related to uses of outer space and space-related activities (as illustrated above); and (e) any applicable international jurisprudence (*e.g.,* decisions of the International Court of Justice on international law).

19 *Ibid*
20 *Ibid*

2. Brief Analysis on the UN Treaties on Outer Space

Considering the breadth of space law and the limitations of this paper, this section only assesses three of the five UN treaties on outer space. It briefly reviews some of their relevant provisions in relation with the development of a commercial space industry, principally with respect to the State's international responsibility and liability for activities of non-governmental entities.[21] Given that it is considered as the *Magna Carta* of space law, our analysis begins with the Outer Space Treaty.[22]

a) The Outer Space Treaty and the Commercial Space Activities

The first question that arises is whether the Outer Space Treaty is applicable to commercial space activities. In that regard, the Outer Space Treaty makes no specific reference to 'commercial space activities' as such. Instead, the Outer Space Treaty provides for broad and general principles on the uses and exploration of outer space. This circumstance might be related to the fact that "this international instrument is what one can call a 'futuristic' one. In fact, it was not created to concretize what was known at the time of its adoption (i.e. in 1967) but to cover also new and future applications of human activity in outer space".[23] As stated by R. Spencer, "[t]he purpose of the *Outer Space Treaty* was to establish general principles to be applied prospectively to govern space [activities]".[24]

The Outer Space Treaty, however, is of particular importance not only because it lays down the general legal regime for any and all activities in outer space, but also for the multiple implications it might have for the development of commercial space activities

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21 Given the extension limitations of this paper, neither the "Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space" nor the "Agreement Governing the Activities of States on the Moon and Other Celestial Bodies" will not be examined.

22 *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*, 27 January 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 (entered into force Oct. 10, 1967). [hereinafter the "Outer Space Treaty"].

23 Vicky Chouinard, *The legal framework related to the privatization and commercialization of remote sensing satellites in the United States and in Canada* (Thesis, 2006) [unpublished].

24 Jakhu *supra* at 5.

in a country such as Costa Rica. This is particularly so in terms of international responsibility and liability for the activities of private companies. In that regard, Article VI of the Outer Space Treaty literally reads:

> "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. 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. When activities are carried on in outer space, including the moon and other celestial bodies, by an international organization, responsibility for compliance with this Treaty shall be borne both by the international organization and by the States Parties to the Treaty participating in such organization".[25]

International Responsibility. As it can be seen, Article VI essentially establishes a special regime for international State responsibility. Typically, under international law, "[a] State is only responsible for acts or omissions which can be attributed to it as its own. (…) In international law a State is responsible for the actions of: (a) the government; (b) any political sub-division of the State; (c) any organ, agency official employee or other agent of its government or of any sub-division acting within the scope of their employment".[26]

Under Article VI of the Outer Space Treaty, however, States are internationally responsible for 'national activities in outer space', whether such activities are carried on by governmental agencies or by non-governmental entities. Hence, States bear international responsibility for national activities conducted by non-governmental entities such as private entities. Here, "it would appear that the description 'non-governmental' refers only to the government of the State, but does not necessarily exclude activities by

25 Art. VI of the Outer Space Treaty.
26 Wallace & Martin-Ortega, *supra* at 198-199.

foreign governments, especially foreign governments acting *jure gestionis*, provided that the activities in question can be classified as the former State's 'national activities'"[27] Moreover, as explained by Dr. Cheng,

> "what is not clear at all in this article [Art. VI of the Outer Space Treaty] is the extent of the overall 'international responsibility' which the contracting States have undertaken in respect of national space activities carried on by non-governmental entities. (…) The narrow interpretation would assimilate space activities carried on by non-governmental entities with governmental activities only in respect of the State's obligations under international law *vis-à-vis* other States, not only under the Space Treaty, but also under general international law. (…) The wide interpretation would extend this assimilation and responsibility even to liabilities, both civil and criminal, under municipal law, of such non-governmental entities, including thus criminal, contractual and tortious liabilities, at least in regard to foreign States and their nationals".[28]

As a note of interest, it should be borne in mind that in English legal jargon, the term 'responsibility' is distinguished from 'liability'. As Dr. Cheng explains, "[i]n law, responsibility would mean (…) that, judged by legal norms, one is considered to be the author of a given act or omission, and to be the cause of all what, in law, are regarded as the consequences of that act or omission. One is consequently answerable for such action or omission".[29] For its part, 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 damages to another".[30] In practical terms, this terminological distinction could create a situation where a State could be deemed *'responsible'* but not necessarily *'liable'*. In Spanish, on the other hand, the same word *'responsabilidad'* is indistinctively used as 'responsibility' (*i.e.,* accountability)

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27 Cheng, *supra* note # 13 at 606. *Jure gestionis* is Latin for 'by way of doing businesses. "A nation's acts that are essentially commercial or private, in contrast to its public and governmental acts". Bryan A. Garner & Henry Campbell Black, *Black's law dictionary* (St. Paul, Minn.: West Group, 1999) at 867.
28 Cheng, *supra* note # 13 at 633-634.
29 *Ibid* at 603.
30 *Ibid* at 604.

and 'liability' (*i.e.,* compensation). Both English words 'responsibility' and 'liability' are equally translated as '*responsabilidad*'. Now, the practical implications might not necessarily be substantial, but being aware of the distinction is necessary to understand the doctrinal elaborations of Anglophone authors.

National Activities and the Duty of Authorization and Supervision. Inasmuch as international responsibility concerns, the Outer Space Treaty does not define what is meant by *'national activities in outer space'* as provided by Article VI. In this author's opinion, an activity is *'national'* as long as it is subjected to a national law, regardless of whether the activities are conducted by governmental agencies or by non-governmental entities, within a territory or not. According to Dr. Cheng,

> "national activities should include all activities by whomsoever carried on within the jurisdiction of a State, including its territorial jurisdiction, quasi-territorial jurisdiction and persona jurisdiction. Thus, in addition to activities carried on by a State's nationals wherever they may be, and those by any person within a State's territory, one should include within the notion of 'national activities' also those by, or on board, ships and aircraft of a State's nationality, wherever these ships or aircraft may be and irrespective of the nationality of the persons involved".[31]

It is also important to note that the obligation of *'authorizing and continuously supervise'* refers to all activities *'in outer space'*. However, the Outer Space Treaty does not offer a definition as to what should be understood as *'activities in outer space'*. Determining what is meant by *'activities in outer space'* is important for delimiting the State's international responsibility and the duty of authorization and continuous supervision.

Commercial space activities comprise of 'space markets' and 'supporting sectors'. On one hand, 'supporting sectors' refer to infrastructure and support industries which

31 *Ibid* at 634. According to Dr. Cheng, "[t]he three types of State jurisdiction are: (i) *territorial* jurisdiction which is what a State exercises over its territory; (ii) *quasi-territorial* jurisdiction over its ships, aircraft, and space objects wherever they may be; and (iii) *personal* jurisdiction over its nationals, again wherever they may be. Ibid., at 659.

include commercial spacecraft manufacturing, space hardware and in-space platforms manufacturing, ground equipment manufacturing, commercial launch services, independent research and development, satellite financing and insurance premiums.[32] These 'supporting sectors' are essential to launch, develop and maintain 'space markets', which refer to the provision of space products and services such as satellite communications, satellite remote sensing and satellite navigation. The following figure is a simplified representation of the commercial space activities, integrating the space products and services (*i.e.,* space markets) and the supporting sectors (*i.e.,* infrastructure and industries):

32 Space Foundation, *supra* at 32.

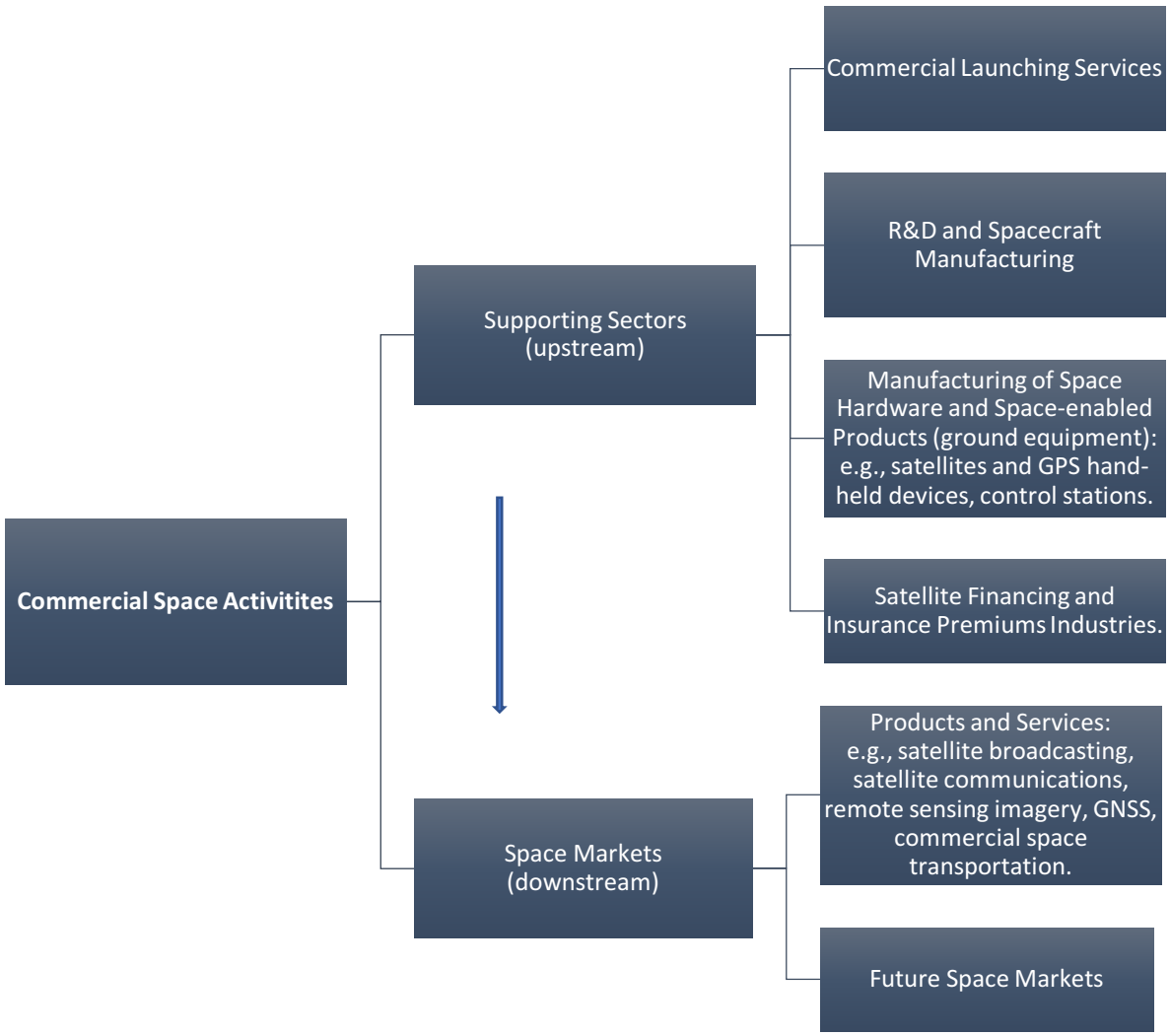

Figure 1 – Space Economy - Markets and Supporting Sectors and Industries[33]

As stated by Dr. Cheng, "contracting States have a critical interest in regulating, as well as, under the Space Treaty, a duty to control and supervise private national space activities in order to ensure that these activities conform to their obligations under the Treaty, under international law, and under the Charter of the United Nations".[34]

33 This chart was created by the author based on the general information contained in the 2011 Space Report. Ibid.
34 Cheng, *supra* note # 13 at 644.

The question here is: which commercial space activities are subject to authorization and continuous supervision? Under a strict interpretation, the phrase *'in outer space'* would exclude activities conducted on the ground or in airspace that are not directly related to a current activity in outer space. Here, launching activities, for example, could be considered as directly related to outer space activities and therefore subject to authorization and continuing supervision. Under a wide interpretation, duties of '*authorization and continuing supervision'* could extend to 'preparatory activities' or activities involved in preparation for the outer space activities, which might include the transportation of space hardware or ground equipment to a spaceport or launch facility. Again, what should be understood as 'preparatory activities'? The Outer Space Treaty does not offer any answers to such questions. In this author's opinion, at least until the Outer Space Treaty is amended so as to clarify this issue, the phrase *'in outer space'* should be interpreted in a 'strict sense'. Extending the scope of the Outer Space Treaty to preparatory activities such as transportation of equipment and space hardware could lead to conflict of laws and hamper the development of the industry. Therefore, preparatory activities, unless conducted in outer space, cannot be considered an 'activity in outer space' for purposes of Article VI.

The Appropriate State. The second sentence of Article VI states that "activities of non-governmental entities in outer space, (…) shall require authorization and continuing supervision by the 'appropriate State' Party to the Treaty".[35] However, the Outer Space Treaty is not clear as to which is the appropriate State. Legal commentators have several views on this issue. To Dr. Cheng, for example, "[a] possible and in fact very plausible candidate would be the State of registry, envisaged under Article VIII of the Treaty".[36] This begs the question of who is the appropriate State in a case where space objects have not been registered by any State. It should be kept in mind that there could be countries where the registration procedure is really lax or virtually non-existent.

35 Article VI of the Outer Space Treaty. [Emphasis added].
36 Cheng, *supra* note # 13 at 609. For purposes of our discussion, Article VIII§1 of the Outer Space Treaty reads as follows: "A State Party to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body". See also Francis Lyall & Paul B. Larsen, *Space law* (Aldershot, England ; Burlington, VT: Ashgate, 2007) at 81-96 [*Space law*]. See also Chouinard *infra* at 42.

As stated by Dr. Cheng, "[i]nternational agreement is necessary in order to clarify and unify the notion of 'national activities' and who is 'the appropriate State' (…); for otherwise it can be very confusing and risky for those who wish to engage in commercial development in space".[37] As the commercial space activities are becoming more globalized, with multinational companies forming international joint ventures, creating international subsidiaries and branches, and entering into international public-private partnerships, defining which State or State(s) would be considered as *'appropriate State'* is now more than ever a critical issue.

One must bear in mind that current commercial space activities are commonly integrated by an interactive combination of public and private players. Whilst a government could play multiple roles as service provider, owner of infrastructure, investor, partner, customer and/or regulator, a private player could also be its supplier, partner and subject of that government's regulation. The particularity in the commercial space industry is that a State could be authorizing and supervising commercial activities in outer space, which are conducted by non-governmental entities, but where such States play multiple roles as regulator, investor, and customer. The challenge there is to find the right balance between the private sector's interest and the States' responsibility for the protection of the public interest.

Customary International Law. Dr. Cheng, and other recognized scholars, affirms that some may claim that this provision has become part of the *'customary international law'*[38]. Consequently, this provision would be biding upon all States, including non-contracting Parties of the Outer Space Treaty.[39] As stated by Wallace and Martin-Ortega, "[m]ultipartite treaties [such as the Outer Space Treaty] may admittedly have a wider effect, and as such, may be regarded as law-making, in that not only do they have a greater number of signatories, but the provision of such a treaty may become customary international law".[40] Furthermore, H. Thirlway states that "if a number of States make a habit of concluding treaties containing certain standard provisions, then this may, in

37 *Ibid* at 659.
38 See also Francis Lyall & Paul B. Larsen, *Space law*, *supra* note # 36 at 70-80. [*Space law*].
39 Cheng, *supra* note # 13 at 644.
40 Wallace & Martin-Ortega, *supra* note at 20. See also Andrew D. Mitchell & Jennifer Beard, *International law : in principle* (Sydney: Lawbook Co., 2009) at 32. [*International law : in principle*].

suitable circumstances, be taken to show that they recognize the existence of a custom requiring them to do so".[41]

Such views suggest that, for example, even though Costa Rica has not ratified the Outer Space Treaty, it could be considered responsible for activities in outer space conducted by its governmental agencies or by non-governmental entities, even if the Costa Rican government has not been actively involved in such activities. According to H. Thirlway, "it may be that, after the convention has come into force, States other than the parties to it find it convenient to apply the convention rules in their mutual relations, and this may constitute State practice leading to the development of a customary rule".[42]

This begs another interesting question: can Costa Rica choose not to be bound by a rule of customary international law? In that respect, Wallace and Martin-Ortega state that "[i]f a State opposes a rule of customary international law and expresses opposition to that rule from the time of the rule's inception, then the State will not be bound by the said rule. Opposition, however, must be demonstrated from the outset. Only then can the State concerned not incur liability".[43] That said, it is unlikely that Costa Rica had expressed its opposition to any of the rules of the Outer Space Treaty from the outset in 1967. It should be kept in mind that, for many years, the scene of the space activities and the early developments in space law were controlled by the US and the USSR. As expressed by Wallace and Martin-Ortega,

> "it can said that it is easier for custom to develop if there are no pre-existing conflicting rules, for example, in the exploration of outer space, rules of behaviour quickly evolved because not only were there no pre-existing norms regulating behaviour, there were only two States, the United States and the Soviet Union, actively engaged in exploration".[44]

41 Malcolm D. Evans, *International law*, *supra* note #17 at 111-112.
42 *Ibid* 113.
43 *Ibid* at 12.
44 *Ibid* at 13.

In this author's opinion, not only Article VI but also other provisions containing general rules of law pertaining to outer space activities such as Articles I, II and III of the Outer Space Treaty, could be considered to have passed into customary international law. The extensive, consistent and almost uniform acceptance and recognition of such provisions of the Outer Space Treaty is considered to have established the *State practice*, which is now accepted as such by *opinion juris sive necessitates*, both essential elements for the conformation of the customary international law. According to the above, it can be said that Costa Rica could be exposed to international responsibility (and consequential liability) for its national activities in outer space, and that there is a duty of authorizing and supervising such activities, whether conducted by governmental or non-governmental entities, regardless of the fact that Costa Rica has not acceded to the Outer Space Treaty. Consequently, approving the Outer Space Treaty is highly recommended to establish primacy of the rule of law so as to reduce legal uncertainty therein to a minimum. Adhering to the Outer Space Treaty does not necessarily require passing national laws implementing the provisions. Indeed, further national implementation should be defined from the perspective of the role Costa Rica can feasibly play in the global context. This issue will be further addressed in the section below on the domestic dimension.

Finally, it is worth observing that of all Central American countries *i.e.,* Honduras, Guatemala, El Salvador, Costa Rica, Panama and Belize, only El Salvador has ratified the Outer Space Treaty. Costa Rica has the status of 'non-party'.

b) The Liability Convention: International Liability

The Liability Convention[45] is generally acknowledged as "an elaboration of the principle of international liability for damage caused by space objects established in Article VII of the Outer Space Treaty".[46] In general terms, Article VII of the Outer Space Treaty, "prescribes that each State that launches or procures the launching of an object into outer space, and each State whose territory or facility an object is launched from, is

45 *Convention on International Liability for Damage Caused by Space Objects,* 29 March 1972, 961 U.N.T.S. 187, 24 U.S.T. 2389, T.I.A.S.No.7762 (entered into force 1 September 1972). [Hereinafter the "Liability Convention"].
46 Cheng, *supra* note # 13 at 636.

internationally liable for damages caused by that object to another State or its natural or juridical persons".[47]

Launching State. Article I of the Liability Convention defines 'launching State' as "(i) a State which launches or procures the launching of a space object; (ii) a State from whose territory or facility a space object is launched". This definition has not been exempted from controverted interpretations as to what should be understood as *'a State which procures the launching'*.

In that regard, Dr. Hermida mentions that "Carl Q. Christol wonders exactly what degree of activity qualifies a procuring State as such".[48] Finally, Dr. Hermida concludes that "each decision as to whether a State falls within the category of procuring state is a question of fact, which should be made on a case by case basis in light of the parameters contained in the definition of launching state".[49]

As a note of interest, according to Chouinard, "the launching State" could also be the 'appropriate State' (referred to in Article VI of the Outer Space Treaty) or vice versa. Moreover, there could be multiple launching States and appropriate States with respect to a particular satellite".[50]

International Liability. An integral interpretation of the provisions of the Liability Convention *vis-à-vis* the provisions of the Outer Space Treaty, will lead to the conclusion that States could actually be liable for activities in outer space of their private entities. For instance, if a private entity operating in Costa Rica procures the launching of a space object through a spacefaring-nation such as the US, Costa Rica could be exposed to be held internationally responsible and liable for such activities as a matter of '*customary international law'* (as arises from the foregoing discussion), despite the fact that the Costa Rican government was not actively involved in the procurement of such launching and that it has not ratified the Outer Space Treaty.

47 Chouinard, (Thesis, at 34 [unpublished].
48 Julian Hermida, *Legal basis for a national space legislation* (Dordrecht; Boston: Kluwer Academic, 2004) at 15.
49 *Ibid* at 16.
50 Chouinard, (Thesis, at 35 [unpublished].

In that regard, Dr. Hermida mentions that "it has been suggested that this conclusion may not be valid in the cases of States that are party to the Liability Convention but are not parties to the Outer Space Treaty. This proposition neglects to consider the validity of customary international rules in the governance of outer space activities".[51]

Joint Launching. Given that it establishes the possibility for States participating in a joint-launching to apportion liability for damages, the Liability Convention is important for small countries such as Costa Rica. In that respect, Article V§2 of the Liability Convention establishes that "[t]he participants in a joint launching may conclude agreements regarding the apportioning among themselves of the financial obligation in respect of which they are jointly and severally liable".[52] Consequently, under the Liability Convention, Costa Rica could reach an agreement with the launching State to apportion the financial burden arising from any joint and several liabilities.

Liability for Damages on the surface of Earth. Another remarkable aspect is that the Liability Convention will provide Costa Rica with some degree of *legal certainty*, inasmuch as it "depicts a victim-oriented approach of responsibility and strict liability of States for international wrongful actions."[53]

A hypothetical case would be helpful to clarify the practical dimension of such statement. Imagine, for example, that a space object launched from Panama enters Costa Rica's airspace and impacts a passenger aircraft just a few minutes after taking off and then both (the space object and the aircraft) crash on Costa Rican soil, causing substantial damage. In such case, the Liability Convention offers a set of basic international rules and procedures to ensure the prompt payment of a full and equitable measure of compensation to victims of such damage caused by the space object.[54]

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51 Hermida, *supra* note # 48 at 13.
52 Article V§2 of the Liability Convention.
53 Chouinard, (Thesis, at 35 [unpublished].
54 Article II of the Liability Convention establishes that "[a] launching State shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the earth or to aircraft flight". It should be noted that here 'absolute liability' is not 'strict liability' (i.e, "liability that does not depend on actual negligence or intent to harm, but that is based on the breach of an absolute duty to make something safe"). See Garner & Black, at 934. The term 'absolute liability' should be understood within the context of Article VI of the Liability Convention.

Currently, of all the Central American countries, only Panama has ratified the Liability Convention. Costa Rica has 'signatory' status.

c) The Registration Convention: Responsibility and Liability Considerations

Of the five UN treaties on outer space, just one has been recently acceded by Costa Rica: the 1975 Registration Convention, which entered into force for Costa Rica on 14 October 2010.[55] It is important to remember, in the words of Brownlie, that "['a]ccession', 'adherence', or 'adhesion' occurs when a state which did not sign a treaty, already signed by other states, formally accepts its provisions. (…) Recent practice has introduced the terms 'acceptance' and 'approval' to describe the substance of accession".[56]

Space Object. The Registration Convention is considered an elaboration upon the Article VIII of the Outer Space Treaty, requiring "that launching States maintain a national registry and that the Secretary General of the UN maintain an international registry".[57] As such, it creates a double registration system (*i.e.,* national and international) for the identification of space objects. This begs the question of what is meant by 'space object' for purposes of registration.

The Registration Convention (as any of the UN outer space conventions) does not offer a definition as to what should be understood as a 'space object' for purposes thereof. Article I (b) of the Registration Convention only states that "[t]he term "space object" includes component parts of a space object as well as its launch vehicle and parts thereof"[58]. In that regard, Dr. Cheng states that "[f]rom the legal standpoint, 'space object' is, in current practice, the generic term used to cover spacecraft, satellites, and in fact anything that human beings launch or attempt to launch into space, including their components and launch vehicles, as well as parts thereof".[59]

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55 *Convention on Registration of Objects Launched into Outer Space*, 14 January 1975, 1023 U.N.T.S.15, 28 U.S.T. 695, T.I.A.S. No. 8480 (entered into force 15 September 1979). [Hereinafter the "Registration Convention"].
56 Ian Brownlie, *Principles of public international law* (Oxford; New York: Clarendon Press ; Oxford University Press, 1998) at 612.
57 Chouinard, (Thesis, at 36 [unpublished].
58 Article I (b) of the Registration Convention.
59 Cheng, *supra* note # 13 at 463.

In simple terms, any object which launches or attempts to launch into outer space is a 'space object'.[60] States should register objects accordingly. This begs the question of which State is in charge of registration.

State of registration. In that respect, Article II (1) prescribes that "[w]hen a space object is launched into earth orbit or beyond, the launching State shall register the space object by means of an entry in an appropriate registry which it shall maintain. Each launching State shall inform the Secretary-General of the United Nations of the establishment of such a registry".[61]

It follows then that the 'launching State' is in charge of the registration. The launching State, again, is defined under Article I (b) as a State which launches or procures the launching of a space object; or a State from whose territory or facility a space object is launched.[62] However, even though there might be multiple launching States, Article II (2) expressly forbids multistate or joint registration; thus, States are obliged to determine which one of them shall register the object.[63] These provisions have substantial practical implications. For example, if a Costa Rican private space company, through the Costa Rican government, procures the launching of a space object with another country such as the US or with a private company providing launching commercial services in the US, then Costa Rica and the US are obliged to determine which one of them shall register the object.

Interestingly enough, if registration is conducted by Costa Rica, then Costa Rica would be the 'State of registration', which has - at least - two direct implications at the international level: (i) Costa Rica would be the 'appropriate State' for purposes of the duty of authorization and continuing supervision (Art. VI of the Outer Space Treaty); and (ii) Costa Rica would retain jurisdiction and control over such object, and over any personnel

60 *Ibid* at 464.
61 Article II (1) of the Registration Convention. [Emphasis added].
62 Article I (a) of the Registration Convention.
63 Article II (2) of the Registration Convention reads: "Where there are two or more launching States in respect of any such space object, they shall jointly determine which one of them shall register the object in accordance with paragraph 1 of this article, bearing in mind the provisions of article VIII of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, and without prejudice to appropriate agreements concluded or to be concluded among the launching States on jurisdiction and control over the space object and over any personnel thereof".

thereof, while in outer space or on a celestial body (Art. VIII of the Outer Space Treaty). As stated by Dr. Hermida, "[t]he main purpose of registration of the object in the national registry is to secure jurisdiction and control over that object in outer space".[64]

Furthermore, Costa Rica, as State of Registration, exerting jurisdiction and control over such space object, being internationally responsible for the activities of non-governmental entities (Art. VI of the Outer Space Treaty, as previously discussed), would also be considered to be a participant in a 'joint launching' for the purposes of international responsibility and consequential liability (Article VII of the Outer Space Treaty and the Liability Convention). In that case, Costa Rica would be liable for damage caused by the space object of its national private company, since Costa Rica would be considered a 'launching State' for the purposes of 'joint and several international liabilities' under Article V of the Liability Convention.

Similarly, using the same example above, the US, as the State from whose territory or facility the space object was launched, would also be considered a 'launching State'. Although the US is not the 'State of registration', as the actual 'launching State' the US could be considered internationally liable for damage (Art. VII of the Outer Space Treaty in relation to Art. II of the Liability Convention). In such case, it is most likely that the US would require an agreement apportioning the financial obligations in respect of which they could be jointly and severally liable (Art. V (2) of the Liability Convention) and establishing an appropriate insurance scheme therefor. As stated by Dr. Cheng,

> "[i]n view of these potential responsibilities and liabilities which various States may incur in any space activity undertaken by non-governmental entities, it is not surprising that States, in making provision for the licensing and control of space activities should require the participants to take out adequate insurance and to impose upon them the duty to indemnify the State against any claim which might be made against it under international agreements". Furthermore, in view of the multitude of States which may be responsible and hence liable in any given case, it would seem essential that the States concerned arrive at some arrangement in advance

64 Hermida, *supra* note # 48 at 63.

regarding jurisdiction and control, as well as the apportionment of liability should it arise. While such arrangements may not be effective vis-à-vis third States, they can be very useful *inter se*".[65]

Unfortunately, the author of this paper has not found any relevant international jurisprudence that sheds some light on these issues. Perhaps, this situation might be related to the relative "youthfulness' of space law and the commercial space activities.

Be that as it may, when dealing with situations of this kind, the following considerations would be helpful for decision-making: (i) whether Costa Rica has actual capability and expertise to execute continuing supervision and exert jurisdiction and control over a space object; (ii) whether Costa Rica has the economic resources to cope with international liabilities should they arise. In actual fact, considering the limited capabilities of Costa Rica at the time of this writing, it is this author's opinion that until appropriate technical capabilities, expertise and know-how is both acquired and developed, previous arrangements should be reached so as to (a) designate the State from whose territory or facility the space object is to be launched as the sole 'appropriate State' for purposes of the duty of authorization and continuing supervision, and to exercise jurisdiction and control; and (b) to make suitable provisions regarding the apportionment of joint and several international responsibility and consequential liability. As Dr. Cheng writes "under Article II (2) of the Registration Convention, [a] space object can be registered in State A, but the State exercising authority over it and the laws applicable on board, including criminal law, health regulations, safety regulations, intellectual property, and so forth, could be those of State B".[66]

Notwithstanding the above, should Costa Rica be interested in retaining jurisdiction and control over a space object, corresponding economic and legal provisions must be made in order to ensure compliance with the obligations imposed by international law, in particular, by the *corpus juris spatialis*, and to manage or reallocate the risks involved in any space endeavour.

65 Cheng, *supra* note # 13 at 639-640.
66 *Ibid* at 628.

As a final point, bear in mind that, under Article II (3) of the Registration Convention, States are totally free to determine what information will be registered and under which conditions the registered information will be maintained. In fact, the Registration Convention "does not necessarily imply the obligation to pass domestic law to create this registry. Therefore, States are free to implement the registry by means of several legal mechanisms".[67]

At the international level, the State of registry must, as soon as practicable, provide the Secretary-General of the UN with the following information concerning each space object: (a) the name of the launching State or States; (b) an appropriate designator of the space object or its registration number; (c) the date and territory or location of the launch; (d) basic orbital parameters, including: (i) nodal period; (ii) inclination; (iii) apogee; (iv) perigee; and (e) the general function of the space object. It should be noted that there is no obligation to register objects before launching. Registration, thus, is *post facto*.

Of all the Central American countries, only Costa Rica has ratified the Registration Convention.

3. Closing Remarks

As arises from the foregoing discussion, the Outer Space Treaty, the Liability Convention and the Registration Convention have established a particular responsibility and liability regime for activities in outer space, whether carried out by governmental agencies or non-governmental entities, which could be considered to be part of customary international law, and thus applicable to all States.

Taking everything into account, it is recommended for Costa Rica to adhere to the Outer Space Treaty and the Liability Convention so as to ensure the country's commitment to the rule of law before the international community, particularly with respect to international responsibility and liability of the State for activities in outer space of private entities, not to mention other specific provisions established therein from which Costa Rica could benefit.

67 Hermida, *supra* note # 48 at 61.

Costa Rica has always been an internationally respected jurisdiction, characterized for an institutional framework subject to the rule of law. Therefore, adhering to the above-mentioned instruments should not represent a major challenge.

B. DOMESTIC DIMENSION

1. Application of Treaties and Conventions in Costa Rica: An Outline

In Costa Rica, treaties and international conventions have to be approved by the procedure established for the formulation of domestic legislation under Chapter III, Title IX of the Costa Rican Constitution. Accordingly, for a treaty or convention to become applicable in Costa Rica, a domestic law must be passed by the Legislative Assembly approving such treaty or convention. Once such law is passed, it must be sanctioned by the Executive Branch and published in the Official Gazette. After that, the instrument of ratification or accession is sent by the Executive Branch to the corresponding depositary governments or organizations.

According to Article VII of the Costa Rican Constitution, treaties and international conventions duly approved by the Legislative Assembly, have a higher authority than any other domestic law. Hence, a ratified or acceded treaty has a "supra-statutory level". In case of conflict with a national, such ratified treaty will prevail.

In addition, according to Article 19 of the 1969 Vienna Convention[68], the Costa Rican Legislative Assembly will have to make reservations at the moment of passing the domestic law approving any treaty or convention.[69]

68 *Vienna Convention on the Law of Treaties*. ratified by Costa Rica on November 22, 1996. [hereinafter the "Vienna Convention"].

69 Article I of the Vienna Convention defines "reservation" as "a unilateral statement, however phrased or named, made by a State, when signing, ratifying, accepting, approving or acceding to a treaty, whereby it purports to exclude or to modify the legal effect of certain provisions of the treaty in their application to that State".

2. Implementation of the UN Outer Space Treaties in Costa Rica: Defining a Legislative and Regulatory Approach

Supposing that Costa Rica adheres to the Outer Space Treaty and the Liability Convention, essential questions would arise: would Costa Rica require further national implementing legislation? If so, what would be the best legislative and regulatory approach? In this author's opinion, to properly answer whether national implementing legislation would be required in Costa Rica, two main aspects should previously be determined: (i) the kinds of space activities (if any) that are currently being conducted by non-governmental entities operating in Costa Rica; and (ii) the kinds of space activities that are feasibly expected or anticipated to be conducted by governmental or non-governmental entities in Costa Rica.

In order to determine the kinds of activities that are currently being conducted by non-governmental entities operating in Costa Rica, a report entitled *"Conditions and Opportunities for the Development of an Aerospace Industry in Costa Rica",* which was released in April 2011 by INCAE Business School, a Harvard-affiliated graduate school for business administration, could be of much use.[70] According to this report, there are approximately 110 companies related to the aerospace industry in Costa Rica. From a total of 47 companies that were selected by PROCOMER as the most representative of the aerospace industry in Costa Rica, it was determined that 37 companies are directly related to the value-chain of the aerospace industry but are not necessarily purely aerospace-related companies, as they provide products and services to other industries.[71] The report states that the value chain is comprised by 'integrators' of aircraft and spacecraft and by 'suppliers'. Suppliers can be organized in 'Tiers' from 1 to 4, according to the supplier's position in the value chain with respect to an integrator such as Boeing or Airbus. As such, Tier 1 suppliers such as Rolls Royce and General Electric are directly connected to an integrator, have an ample relationship and constant communication with integrators due to the complexity of the manufactured products,

70 Luis Algarañaz et al, *"Condiciones y Oportunidades para el Desarrollo de la Industria Aeroespacial en Costa Rica"* (Alajuela, INCAE Business School, 2011) [unpublished] [in Spanish]. The study was done with support from the Costa Rican Foreign Trade Promoter ("Procomer"), international consultants and advanced students from INCAE Business School, at the request of the Central American Aeronautical and Space Association (ACAE).
71 *Ibid* at 7.

which sometimes include joint product-design. Common products include propulsion systems, aeronautic systems, landing gears, and fuselage parts. Tier 2 suppliers have less rooted or inexistent relationships with integrators, given that transfer of information is handled by Tier 1 suppliers. Generally, Tier 2 suppliers work under specifications provided by the Tier 1 suppliers. Manufactured parts are usually incorporated to Tier 1 products (*e.g,* joystick for an aeronautic system). Tier 3 suppliers provide sub-assembly services and light manufacturing of components that on their own will not be considered a finished product, usually related to electronics and mechanics. Tier 4 companies provide less complex sub-assembly services and supporting processes such as plastic and metal molding. As part of the aerospace industry's value chain, Tier 4 products are usually requested by Tier 3 suppliers; but not necessarily, as Tier 3 and 4 suppliers serve multiple industries.[72] Finally, the report establishes that companies in Costa Rica can be positioned in Tiers 3 and 4 and as companies that provide services but that are not part of the value-chain of the aerospace industry.[73]

The first aspect to note is that no private company operating in Costa Rica at the moment is conducting 'activities in outer space'. In fact, companies operating in Costa Rica are more related to the value chain of the aerospace industry. There is a distinction between the 'aerospace industry' and the 'space industry'. As noted in the 2007 Space Economy report, "[a]ccording to ISIC 3530, the aerospace industry comprises the production of all aircraft and spacecraft, but space-related services such as telecommunications are not included".[74] In addition, the 2007 Space Economy report clarifies that the aerospace industry includes

> "the manufacturing of "both non-space items (passenger and military aeroplanes, helicopters, gliders, balloons, etc.) and space items (including spacecraft, spacecraft launch vehicles, satellites, planetary probes, orbital

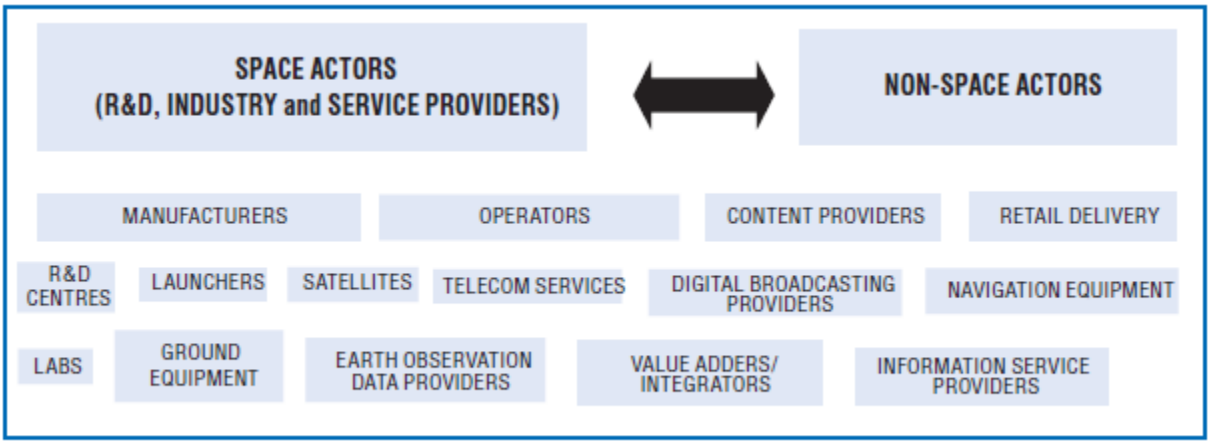
72 *Ibid* at 23-24.
73 *Ibid* at 28.
74 OECD International Futures Programme, "The space economy at a glance", online: OECD <http://www.sourceOECD.org/books/16080270/scienceIT>.

stations and shuttles). This also includes the manufacturing of their parts and accessories, used in civil or military applications".[75]

The provisions of the UN treaties on outer space activities are directly applicable to *'activities in outer space'* which are directly related to the operation of 'satellite systems' and the provision of services thereof (*e.g,* satellite broadcasting, satellite remote sensing); however, considering that space hardware and products are manufactured on Earth *i.e,* there is no manufacturing activities in outer space yet, and seeing manufacturing is not related to a current activity in outer space, the duty of authorizing and supervising activities in outer space does not include manufacturing activities.

One should notice that the actual duty of *'authorization and continuous supervision'* established under the Outer Space Treaty should be determined based on the type of activity and not on governmental agency or non-governmental entity involved. In other words, it is irrelevant whether a non-governmental entity is classified as a 'space company' or an 'aerospace company'. The commercial space industry is comprised by multiple international and domestic value-chains that include both space and non-space actors at different levels. The 2007 Space Economy report provides a simplified but useful overview of the commercial space industry in the following picture, which provides a hint of the potential long value- chains of the commercial space industry:

75 *Ibid*



Source: OECD IFP (2006).

Figure 2 - Overview of the Space Economy[76]

As we may see, the value chains depart from R&D centers and manufacturers of space hardware (*e.g.,* Boeing and Thales) and space-enabled products (*e.g.,* Garmin for GPS portable devices or Research In Motion, Inc for Blackberry), passing by operators of telecom services and earth observation data providers (*e.g.,* Hughes Electronics Corporation, GeoEye, Inc., Inmarsat, Intelsat and Thales Alena Space), through content providers (*e.g.,* Google Earth, DIRECTV and Sky), and retail delivery (*e.g.,* Best Buy, AT&T Mobility, Wal-Mart, etc.).

Considering the nature of current activities conducted by companies operating in Costa Rica, the duty authorization and continuous supervision established under the Outer Space Treaty is not legally required. Therefore, one could easily presume *prima facie* that national implementing legislation is not necessary at this time. Before reaching such conclusion, however, the kinds of activities that could be feasibly expected or anticipated in the future should be determined so as to establish whether proactive national implementation would be recommended for Costa Rica. In that regard, Ad Astra Rocket Company, for example, has announced its intention of testing its plasma rocket engine in outer space within the coming years. In this author's opinion, it is important for Costa Rica to be proactive rather than reactive to the national implementation so as to avoid uncontrolled decision-making, incoordination and irresponsible improvisation. If Ad

76 This chart was taken from *ibid* at 18.

Astra Rocket Costa Rica intends to register a space object in Costa Rica, the Costa Rican government should start working on establishing –in advance- registration procedures, licensing and supervision procedures not only to facilitate such endeavor for private companies but also to comply with international obligations.

Certainly, implementation should follow once the treaties have been ratified or acceded. In any case, national implementation of the UN treaties on outer space is not an easy task. It requires examining if there are any domestic laws or regulations in contradiction with the provisions established therein. It involves defining what would be understood in Costa Rica as *'national activities in outer space'* or *"space object'* for the purposes of the Outer Space Treaty, the Liability Convention and the Registry Convention. In addition, national implementation of the UN treaties on outer space will pose the challenge of elaborating a Costa Rican perspective on longstanding issues related to outer space. For instance, where does space begin? What is the Costa Rican vision for the future uses of outer space? Will Costa Rica support the military uses of outer space? Formulating a Costa Rican position on these issues would require pluralistic analysis and discussion. Political scientists, space experts, economists, lawyers and other have much to offer in terms of developing a concerted perspective.

Most importantly, perhaps, is the fact that implementing the UN treaties on outer space requires the definition of a legislative and regulatory approach. Space-faring nations such as the US and France have adhered to the Outer Space Treaty, the Liability Convention and the Registration Convention. Yet, their regulatory approaches for national implementation and regulation of activities in outer space differ.

In the US, the space industry is heavily regulated. Historically, the country has opted for a highly-detailed and activity-specific legislative and regulatory approach. As such, its legal framework "consists of a series of laws and regulations which govern specific aspects of different space activities, as well as several non-specific norms which have a direct impact on the space industry".[77] In France, on the other hand, until recently, "there was no specific space legislation (…). Space activities were regulated by the general law and also by specific laws applicable to certain activities such as

77 Hermida, *supra* note # 48 at 246.

telecommunications and broadcasting".[78] In fact, "French law applicable to space activities [consisted] of a series of scattered contractual, administrative and regional norms and arrangements which [had] been adopted for each space program as the needs arose".[79] It was not until "June 3rd 2008 [that] the French Parliament adopted Act no. 2008-518 on Space Operations. The objective of the Act is to implement France's international legal obligations under space law treaties, in particular, those obligations dealing with, responsibility, liability and registration".[80] But then again, which approach is the best? How do you determine the best legislative and regulatory approach for developing a space industry in Costa Rica? Should Costa Rica elaborate highly detailed-legislation and regulations following the US regulatory approach, or should Costa Rica establish a general framework of basic principles to be further elaborated by implementing agencies through regulations or agreements on a case-by-case basis?

In this author's opinion, a legislative and regulatory approach, and consequently, a legal framework, should be tailored in accordance with the country's particular motives, needs, strengths and goals. Such motives, strengths and goals have not been established by the Costa Rican government yet. It is high time for CONIDA to deal with this challenge. A policy framework is the appropriate instrument to that end. Law is essentially a matter of policy. A policy framework would provide content and direction for law-making and rulemaking and implementation thereof. As stated by M.H. Shaw, "[l]aw and politics cannot be divorced. They are not identical, but they do interact on several levels. They are engaged in a crucial symbiotic relationship. It does neither disciple a service to [minimize] the significance of the other".[81]

3. Closing Remarks

78 Ram S. Jakhu, *National regulation of space activities* (Dordrecht; New York: Springer, 2010) at 109.
79 Hermida, *supra* note # 48 at 246.
80 Jakhu, *supra* note # 70 at 210.
81 Malcolm N. Shaw, *International law* (Cambridge, UK; New York: Cambridge University Press, 2008) [*International law*].

It should be borne in mind that the domestic dimension of the legal framework not only refers to the national implementation of the UN treaties on outer space. It also involves examining the potential consequences that current domestic laws could have for the development of a space industry. For instance, bearing in mind that Costa Rica abolished its military in 1949, would it be legal in Costa Rica to manufacture and export 'dual-use' technologies and products? Given the limitations of this paper, this question will not be examined. However, it is important to note that in the space industry the "infrastructure can be used for both civilian and military applications as space technologies are by nature dual use".[82] For instance, "space launchers are modified guided missiles"[83]. This is not an easy question to answer, especially because defining a 'dual-use technologies' is still a problematic endeavor. As indicated by M. Burris,

> "[t]here is no precise definition for the term "dual-use"-perhaps because the term belies a precise definition. Generally, '[d]ual-use technology consists of products and know-how -both tangible and intangible technology- that have potential military use, but that are primarily commercial in design, and are in fact widely traded and used for non-military purposes'".[84]

Moreover, in view of their dual-use nature, countries such as the US have imposed 'export controls' to restrict the trade of -*inter alia*- arms and space technologies with other countries which are considered to have the required capabilities to reproduce and manufacture such technologies (*e.g.,* China). As stated by M. Burris, the rationale behind strategic export controls rests on the "maxim: do not arm your enemies".[85] In light of the sensitive nature of space technologies, there are sectors or levels in the value-chain of the space and aerospace industries that are not footloose. In other words, companies such as Boeing might not be entirely free to transfer technologies or to establish subsidiaries in any country at any given time simply because there are laws and

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82 Programme, online.
83 *Ibid* at 23.
84 Matthew D. Burris, "Tilting at windmills? the counterposing policy interests driving the U.S. commercial satellite export control reform debate", online: McGill University Library <http://digitool.Library.McGill.CA:8881/R/?func=dbin-jump-full&object_id=95254>. [Footnotes omitted].
85 *Ibid* at 15.

regulations that have been adopted to prevent the spread and transfer of technologies and knowledge. Such laws and regulations respond to guiding-principles such as 'leadership' and 'national security', which are part of the space policies of the US. Such policy goals justify legal institutions such as 'export controls'.

This begs other questions: what would be the practical effects for a country such as Costa Rica establishing relationships with China for the development of a space industry? Would this have an effect on Costa Rica's commercial relationships with the US? Would this affect companies currently operating or interested in establishing operations in Costa Rica? Examination of these questions escapes from the parameters of this paper; suffice it to say here that one should be aware of the 'geopolitics of space' for purposes of policy-making and law-making processes.

As a final point, the domestic dimension of the legal framework needs to address not only the current needs of companies operating in Costa Rica, but also establish possible mechanisms to foster the development and economic growth of the industry, in line with the general development, economic and social policy outcomes of the country.

Again, the legal framework, in its international and domestic dimension, needs to be shaped by a policy framework. Before establishing a legal framework, Costa Rica needs to start by defining a space policy establishing the country's expectations from developing such industry, the country's strengths and feasible role, and most importantly, the objectives that will provide direction and content for law-making, rule-making, and implementation thereof. Once a space policy has been defined, a legal framework can be developed for the realization of the policy outcomes.

In light of the above, the following section attempts to provide a conceptual framework to understand the need for a space policy in Costa Rica.

II. LAYING THE BASIS FOR A SPACE POLICY IN COSTA RICA

Despite the large number of legal studies in space law, one key factor that might be easily overlooked is the importance of space policy. As stated by Eligar Sadeh, "space policy as a subject matter for research and teaching has not received the attention of the

academic community in a significant way".[86] Space policies have provided a frame of driving-principles and goals in certain areas that, in the words of Carl Sagan, make 'real political sense', so as to justify spending significant amounts of money in space activities.[87] The commercialization of space has been one of those areas. For that reason, and considering that the current commercial space industry was shaped by a number of commercial space policies in the US, it is important to briefly review the role that such policies have played in the space industry. This section shortly examines the space commercialization policies in the US from a historical and doctrinal approach.

A. ANALYZING THE US COMMERCIAL SPACE POLICY: AN EVOLUTIONARY PROCESS

1. *Introductory Considerations on the US Commercial Space Policies*

In the US, as stated by P. Dempsey, polices "can be found in both the language of statutes promulgated by Congress (wherein the Congress declares national policy), and in directives, executive orders and other communications of the President".[88]

Policies offer legislators with a basis for lawmaking and law-reform and also provide agencies with direction for rulemaking and implementation thereof. As P. Dempsey states that, "[p]olicies set the tenor and tone of law, though they are not legal directives *per se.* However, they do reveal the overriding goals of the legislative body as expressed in the law, and of the executive branch in the implementation of law".[89] In the US, space policies "of the US executive and legislative branches fall into the following general categories: Leadership, Cooperation, Peace, Defense, Science and Technology, Cost-Effectiveness, Commercialization, [and] Environmental Protection".[90] In that respect, commercial space policies have provided the US government with a longstanding and steady direction for lawmaking, rulemaking and implementation of its

86 Eligar Sadeh, *Space politics and policy : an evolutionary perspective* (Dordrecht; Boston: Kluwer Academic Publishers, 2002). [Sadeh].
87 In that regard, late Prof. Carl Sagan observed "[t]he lesson to me seems clear: there may be no way to send humans to Mars [or back to the Moon] in the comparatively near future, despite the fact that it is entirely within our technological capability. Governments do not spend vast sums just for science, or merely to explore. They need another purpose, and it must make real political sense." Carl Sagan, *Pale Blue Dot* cited ibid at xiii.
88 Jakhu, *supra* note # 70 at 373.
89 *Ibid*.
90 *Ibid* at 374.

commercial space programs. To the private sector, such policies have provided a certain degree of legal certainty. Private investors and entrepreneurs have a "clear policy framework within which to make their calculations".[91] Therefore, private players could - to a certain extent- forecast possible business opportunities and identify investment risks.

Policies, of course, are not excluded from facing practical difficulties or challenges. For instance, contradictions amongst policy goals can arise. In that sense, P. Dempsey mentions that "[g]lobal leadership in space technology, research and development may conflict with goals of international cooperation".[92] Ideally, rule-makers and implementing agencies will have to attempt to balance up competing goals both for the benefit of the industry and country's economic and social interest.

In addition, dichotomies can arise between what the policies say and what the government actually does. For example, P. Dempsey states that

> "[i]n its policies, the United States confirms that it will adhere to existing space law and treaties, though by its actions, it has exhibited little enthusiasm for the promulgation of new conventions. That may change over time as space transportation, and the commercial development of space tourism, mining and other activities, require the definition of legal rules to reduce investment risk".[93]

Here it is clear that the US will only adhere to UN outer space treaties so long as they do not clash with its space commercial policies. A policy framework provides a common-ground and direction to the executive and legislative branches. Naturally, a policy framework has to be complemented with a legal framework. One without the other is meaningless. The following part attempts to illustrate how policies can shape or reshape the development of space activities. It is focused on the US not only because its commercial space policies and domestic laws exert considerable influence over other countries and international organizations, but also because the US had a leading role in

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91 Development International Institute for Sustainable et al, "Designing policies in a world of uncertainty, change and surprise adaptive policy-making for agriculture and water resources in the face of climate change : phase 1 research report", online: International Institute for Sustainable Development = Institut international du développement durable ; Energy and Resources Institute.
92 Jakhu *supra* note # 70 at 375.
93 *Ibid* at 403.

the space commercialization crusade that led to the development of the current space industry.

2. Overview of the Space Commercialization in the US: From a Policy Perspective

It is generally accepted that the *"space age"* officially began in 1957 with the launching of the first artificial satellite called *Sputnik 1* by the Union of Soviet Socialist Republics ("USSR").[94] As stated by Dickson, "[i]t was silver in color, about the size of a beach ball, and weighed a mere 184 pounds (83 kg). Yet for all its simplicity, small size, and inability to do more than orbit the Earth and transmit seemingly meaningless radio blips, the influence of Sputnik on America and the world was enormous and totally unpredicted".[95] Indeed, *Sputnik 1* marked the beginning of the *"space race"* between the United States of America (the "US") and the USSR. In 1958, the US Army quickly responded to *Sputnik* by launching the *Explorer* satellite, "signaling America's entrance into the space race".[96] In April 12, 1961, "Soviet cosmonaut Yuri Gagarin became the first human in space, flying Vostok 1 on a one-orbit mission around the earth".[97]

The US had to come up with a major response to the USSR challenge. Consequently, in May 25, 1961, President John F. Kennedy pronounced a speech establishing as a national goal to land a human on the Moon before the end of the decade, which was successfully culminated by the Apollo mission in July 1969.[98] In that respect, it is important to note that President Kennedy actually established -through his speech- a new space policy: all efforts would be focused on proving supremacy in outer space by landing a human on the Moon. Given the geopolitical circumstances during the 1960s, spending money on the Apollo mission was accepted from a political perspective. As stated by Goldman, "the military advantage and national prestige were the primary

94 L. B. Taylor, *Commercialization of space* (New York: F. Watts, 1987) at 11.
95 Paul Dickson, *A dictionary of the space age* (Baltimore: Johns Hopkins University Press, 2009) at 11. online: Google Books <http://books.google.com/books?id=afKBvKlg10-EC&lpg=PP11&pg=PR11#v=onepage&q&f=false>.
96 Lewis D. Solomon, *The privatization of space exploration : business, technology, law and policy* (New Brunswick, N.J.: Transaction Publishers, 2008) at 15.
97 *Ibid*.
98 Taylor, *supra* note # 94 at 17.

motives for the great space race. The Soviet Union and the United States pursued these goals in the context of global competition".[99] It was a time when "NASA had not only ample funding but also ready political and public support and a high degree of autonomy".[100]

During the 1970s, however, military prowess and national pride and prestige started to be considered as tainted excuses for spending taxpayers' money in space exploration. Such endeavor was deemed to be "unproductive, expensive and dangerous".[101] As L. Solomon writes, "[a]fter the Apollo's success in 1969, the United States was too distracted by the Vietnam War and the nation's social problems to commit substantial resources to the human exploration of the space frontier as it had in the 1960's".[102]

During the 1980s, as explained by Lyall and Larsen, "Thatcherism and Reaganomics occurred and many ideas as to the proper role of the state changed. Competition came to be seen as preferable to monopoly in the public interest. Governments divested themselves in whole or in part of responsibility for rail and air services".[103] Commercialization and privatization was perceived as the best recipe to achieve higher productivity and efficiency not only for the exploration but for the 'exploitation' of space. As pointed out by Taylor, "[t]here is a historic precedent for the space commercialization movement. The transfer of major responsibilities from government to private industry happened earlier (…) with the aviation industry. But this did not happen until the government had overseen the formative years of the young industry".[104] The idea of space commercialization was, therefore, nothing new.

Notwithstanding the above, there were two key events which, according to L. Taylor, unofficially launched the age of space commercialization in the US. These events were (i) the successful initial test flight of the US Space Shuttle *Columbia* on April 12,

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99 Nathan C. Goldman, *Space commerce : free enterprise on the high frontier* (Cambridge, Mass.: Ballinger Pub. Co., 1985) at 12.
100 Solomon, *supra* note # 96 at 17.
101 Goldman, *supra* note # 100 at 3.
102 Solomon, *supra* note # 96 at 19.
103 Francis Lyall & Paul B. Larsen, *Space law : a treatise* (Farnham, Surrey, England; Burlington, VT: Ashgate, 2009) at 380-381.
104 Taylor, *supra* note # 94 at 23.

1982, the recently extinct reusable orbital transportation system; and (ii) a new national space policy set by President Reagan in his State of the Union address on January 25, 1984, asking NASA to begin effecting a transition that would lead to the operational use of space.[105]

In fact, the US space policy of 1984, originally "designed to help reduce the risks of doing business in space", was further complemented with a number of legal reforms intended to commercialize and privatize space activities. As mentioned in the Harvard Journal of Law and Technology, "NASA's responsibility with respect to commercial activity did not become explicit statutory policy until July 16, 1984. On that date, Congress amended the Space Act to include the following provision: "The general welfare of the United States of America requires that [NASA] seek and encourage, to the maximum extent possible, the fullest commercial use of space".[106] This is actually a clear shift in the space policy that would redefine the course of the space industry during the following decades. According to W.D. Kay, the Reagan administration had a clear idea of the most important benefits of space, which were incorporated and redefined the US space policy by setting as primary missions the 'national defense' and 'development of space commerce by the private sector'.[107] Consequently, "there was never any question as to the proper mechanism for exploiting the economic benefits of space. The very first Administration policy statement on space called specifically for a 'climate conducive to expanded private sector investment and involvement in space activities'".[108] This policy would provide direction and content both for law and rule-making in the US. There was a clear vision and strong-willpower, essential elements to achieve progress in the space conquest, which should be present in any policy framework.

It is worthwhile to note, as W.D. Kay writes, that "[w]ith regard to space policy, neither of the two new definitions promulgated by the Reagan Administration - defense

105 Taylor, *supra* note # 94 at 11.
106 Harvard Journal of Law & Technology, "Commercialization of Space, Commercial Space Launch Amendments Act of 2004" 17: 2 Spring Harv. J.L. & Tech. 619 at 622, online: HeinOnline < http://www.heinonline.org/HOL/Page?handle=hein.journals/hjlt17&id=1&size=2&collection=journals&index=journals/hjlt#590> [hereinafter "Harv. J.L. & Tech."]. [Footnotes omitted].
107 W. D. Kay, "Space Policy Redefined: The Reagan Administration and the Commercialization of Space" (1998) 27:1 Business and Economic History at 239-240.
108 *Ibid* at 240. [footnotes omitted].

and commercialization- offered much of a role for NASA. The size, structure, and operations of the nation's space agency were specifically designed to carry out a different sort of mission".[109]

For its part, the NASA's space shuttle program was intended to constitute a means of relatively lower-cost access to space, which would reduce the economic burden for US private companies and entrepreneurs, helping to achieve the goal of space commercialization. It often suggested that "[f]ollowing its victory in the "space race," NASA struggled to find a new *raison d'être*. The establishment of the Space Shuttle program functioned as a "life preserver" for the agency".[110] Similarly, L. Solomon writes that "after Apollo, and alongside its various projects and programs, NASA committed to the lofty goal of routine access to space at a relatively economical cost in the form of the Space Shuttle".[111]

It was a transition period from a government-exclusively driven to a public-private driven industry. Assessing NASA's success in achieving commercialization of space is not a simple task and it goes beyond the purposes of this paper. Suffice it to say here that consequent commercial space policies have been instrumental in creating the conditions that encourage the private sector participation in space businesses and reshaped the US space program towards the development of a more globalized commercial space industry.

Reagan's space policy was a response to other factors that were compelling the US government to boost the commercialization of space. International competition was undeniably one of those factors. In Europe, for example, Arianespace, a private company created in 1980 by European aerospace firms, banks and the French space agency, "combined the best of both worlds: the marketing freedom of a private company, plus the direct support of government agencies".[112] Moreover, A. Butrica mentions that, for

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109 *Ibid* at 240.
110 Harv. J.L. & Tech, at 621.
111 Solomon, *supra* note # 96 at 20. L. Solomon further writes that "[o]ne of the reasons that the shuttle flew so seldom was that it was not fully reusable, or at least not in the sense implied by NASA. Although the basic vehicle could be reused after a spaceflight, NASA had to expend thousands of work hours and millions of dollars retooling many of the shuttle's hardware between flights". *Ibid* at 21.
112 *Ibid*.

example, due to a number of reasons "having to do with the regulatory environment and government policy, it was not until 1989 that SSI [Space Services, Inc., a US private company] entered the commercial launch market, which was then monopolized by Arianespace".[113] In support of that opinion, W.D. Kay describes that,

> "[o]n September 9, 1982, a Houston-based firm, Space Services Incorporated of America, launched the first privately-developed commercial rocket, named Conestoga I. Before it could accomplish this historic feat, however, the company was first forced to confront a legal and regulatory tangle that involved 22 different federal statutes and 18 separate agencies, including NASA, the Federal Aviation Administration, the Federal Communications Commission, the State Department, and the Bureau of Alcohol, Tobacco, and Firearms".[114]

For that reason, the report of the Working Group on Commercial Launch Operations, which had been established by order of President Reagan in 1983, recommended that a single federal agency serve as a 'focal point' between the government and private launch providers (an arrangement which would become known as 'one stop shopping') to 'expedite the processing of private sector requests to obtain licenses' to operate expendable launch vehicles.[115]

As we can see, the Reagan administration, following its commercial space policies, undertook major government reorganizations and gradually paved the way for US private companies not only to participate but also to be competitive at the international level.

In 1989, President Ronald Reagan was succeeded by George H.W. Bush, who would quickly make clear his determination "to continue the Reagan-inspired approach to space commercialization".[116] According to P. Dempsey, for instance,

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113 *Ibid* at 214.

114 Kay, *supra* note # 115 at 241. Kay writes that "[t]here was no question about these laws and regulations meeting legitimate public objectives (insuring public safety and compliance with international treaties, coordinating usage of public airwaves, etc.). On the other hand, each had been developed independently over long periods of time, and obviously without regard for (the then non-existent) commercial space launches".

115 *Ibid*.

116 *Ibid* [Footnotes omitted].

> "[i]n signing the bill to ensure the applicability of US patent law to discoveries in outer space, President George Bush (the Elder) said, "[t]he certainty that inventions that advance space technology will be recognized under (…) patent laws will encourage the private sector to undertake commercial space venture, which is one of our important objectives under National Space Policy."[117]

During the Clinton administration, the space commercialization policies were present as well. To W.D. Kay, however, "[a]lthough its National Space Policy [called] for encouraging 'private sector investment in, and use of, space technologies', this [did] not appear to be as high a priority as it was in the past two administrations". However, that view is not necessarily correct as there were important legal reforms during Clinton's administration that were conducted in line with its commercial space policies. For instance, the Commercial Space Act of 1998 was signed to foster the commercialization of the International Space Station and other space segments such as commercial launch vehicles and to examine the feasibility of privatizing the space shuttle.[118]

The privatization and commercialization goals were emphasized in the US national space policies during the first decade of the 2000s. Under George W. Bush's administration, the goal of commercialization of space was clearly manifested when Congress passed the Commercial Space Launch Amendments Act of 2004. In that regard, P. Dempsey states that "the US Congress established a strong policy in favor of promoting commercial launches, reentry, and launch sites with stable and minimal regulatory oversight applied fairly and expeditiously, so as to enable the US to retain its competitive position internationally, and contribute to the national defense and economic well-being of the nation".[119] During this decade a number of thriving commercial markets sprung, as a materialization of the commercial space policies established since the 1980s. As stated by Shove, just from 2001 to 2003,

117 Jakhu, *supra* note # 70 at 389.
118 Jakhu, *supra* note # 70 at 389. [Footnotes omitted].
119 *Ibid* at 391. [Footnotes omitted].

> "several commercial businesses became operational, and they [were] having a profound effect on global economic development and society in many ways: space-based radio for consumers, space satellite cell phone service, highly accurate global navigation systems, remote sensing satellites providing 2-ft resolution imagery of earth, and satellites providing global digital TV directly to consumers' homes".[120]

Finally, as said by P. Dempsey, "[t]he 2006 US Space Policy advocates increased 'private sector participation in the design and development of United States Government space systems and infrastructures".[121] Similarly, in the National Space Policy of 2010, the US government is committed to "encouraging and facilitating the growth of a U.S. commercial space sector that supports U.S. needs, is globally competitive, and advances U.S. leadership in the generation of new markets and innovation-driven entrepreneurship".

[122]

3. Closing Remarks

If nothing else is evident from this brief historical review of commercial space policies, it should be noted that the US space policies have reacted not only to major political events (*i.e,* Sputnik 1, Gagarin's first flight to space) but also to economic changes (*i.e.,* international competition for space commercial markets and technological supremacy). In other words, the formulation, implementation and change of space policies involves considering not only goals and motives (*i.e.,* policy outcomes) but also geopolitical and economic aspects related to the industry. In the words of Sadeh,

120 Christopher Shove, "Emerging Space Commerce and State Economic Development Strategies" (2005) 19:2 Economic Development Quarterly at 191.
121 Jakhu, *supra* note # 70 at 391. [Footnotes omitted].
122 National Space Policy of the United States of America at 3, online: The White House < http://www.whitehouse.gov/sites/default/files/national_space_policy_6-28-10.pdf>

> "Space Policy involves both the process (Space Politics) of policy formation and policy change over time, and the courses of action taken to achieve political and technological determined outcomes (Space Policy). Space Politics involves the process by which historic conditions, rationales for space, and advocacy coalitions interact with and impact agenda-setting; actors and institutions (Presidents, Congress, and the space bureaucracy) interact with and impact public policy formulation and implementation; and how policy outcomes bring about policy change (emergence of privatization and commercialization). Space Policy deals with the outcomes that include such areas as the environment, law, commerce, international cooperation, and national security".[123]

It is worthwhile to note that the US government has been committed to achieving the policy outcomes *i.e.,* commercialization and privatization of space activities- during the course of several administrations. Although space policies have been constantly reformed, the core elements of the Reagan's space policies *i.e.,* commercialization and privatization have been a common denominator in the US space policies for more than 20 years. These constant driving-goals have consistently outlined the pathway and provided substantial content for lawmaking, rulemaking and implementation thereof. In other words, the realization of policy outcomes is a long-term process.

The US government early realized that for developing a space industry, commercialization of technologies and the involvement of the private sector were essential elements. The government cannot develop space markets on its own. The US assessed its capabilities and feasible role and decided to redefine its space policies in accordance with such considerations. The space policies of President J.F. Kennedy and R. Reagan had such elements and hence were quite successful. Indeed, Costa Rica could learn from the US experience in that regard.

123 Sadeh *supra* note # 86 at xiv.

In order to develop a space industry in Costa Rica (including a cluster of aerospace companies), the attraction of private investors, protection of intellectual property rights, creation of financing alternatives and infrastructure improvement are critical elements. A policy framework should –as a minimum- address such issues. The challenge for Costa Rica is to create an integral policy framework, encompassing a clear vision, concerted goals, and strong willpower. CONIDA has been established and it should rise to that challenge. Perhaps, the actual challenge is to find the required 'political motives' that set the wheels in motion.

CONCLUSIONS

A policy and legal framework is an essential component for the development of a space industry in Costa Rica. Such endeavor is a worthy voyage to embark on for Costa Rica. In fact, Dr. Franklin Chang-Díaz was the first to get on board a long time ago, even before he was selected by NASA to become an astronaut in May 1980. In all fairness, Dr. Chang-Díaz is an inspiration to all Costa Ricans, not only because he is a veteran of 7 space flights, but because his path was not exempted from the pitfalls or difficulties that every Costa Rican must face. He tackled the contrariness of those who did not believe a Costa Rican could become an astronaut; he did not give up without a fight. Dr. Chang-Díaz proved to us, Costa Ricans, that anything is possible for us, that we are capable of reaching our goals and that there is no limit for those who aim at the stars.

For those reasons, it is only natural that we, Costa Ricans, as a nation, get together and support the path laid by Dr. Chang-Díaz, as a way to express our gratitude for what he represents, and more importantly, for the benefit of future generations. Space technologies offer a plethora of benefits and tools for economic and social development for Costa Rica (and Central America). A myriad of examples could be found in space applications such as satellite navigation and satellite remote sensing. However, no substantial progress will be achieved without a clear policy and legal framework, encompassing clear direction, concerted goals and strong willpower.

A policy framework would not only give direction for lawmaking, rulemaking and implementation thereof, but also will ensure continuity to any initiatives or programs

through subsequent governments. Costa Rica should start by formulating and promulgating a policy framework as soon as possible.

A policy should be the result of extensive consultations with local and international interest groups, which includes the private sector, academia and government agencies. A policy framework should identify the feasible role of Costa Rica by recognizing its strengths and limitations, goals and challenges so as to provide content for budgeting, lawmaking, rulemaking and implementation.

The legal framework should be defined by the policy framework. Such legal framework should be comprised by an international and domestic dimension. The international dimension refers to the adherence of the Outer Space Treaty and the Liability Convention, so as to ensure the country's commitment to advance the rule of law, particularly with respect to international responsibility and liability of the State for activities in outer space of private entities. This is important to confirm Costa Rica's position as an internationally respected jurisdiction with a preponderant and determinant role in creating sound, realistic and permanent opportunities for advancing the rule of law and social and economic development in Central America. The domestic dimension refers to the national implementation of the UN treaties on outer space, as well as eventually complementing the policy framework with supportive legislation and regulations so as to maximize the social and economic benefits that the creation of a space industry could bear to Costa Rica.

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