

The Elusive Frontier: Revisiting the Delimitation of Outer Space

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This paper proposes a reassessment of the legal concerns related to the vertical extension of State territories, acknowledging the different regimes applicable to air space and outer space. Taking into consideration the vast amount of proposals offered by scholars and diplomatic delegations on this subjected matter, as well as principles of Comparative Law, it is hereby formulated an alternative for delimitation of this elusive final frontier. It should be recalled that, in accordance to the Chicago Convention, of 1944, States hold absolute and exclusive jurisdiction in relation to their respective air spaces. On the other hand, the Space Treaty, of 1967, establishes that outer space cannot be subjected to national claims of any kind. Nevertheless, the border that distinguishes such contrasting legal regimes remains to be provided. At the United Nations Committee on the Peaceful Uses of Outer Space (COUPOS), it has been possible to identify two approaches related to this topic: the first, of the group of countries recognized as “spatialists”, supports a clear delimitation of the frontier between air space and outer space, founded on scientific or commonly accorded criteria; the other, of the ones known as “functionalists”, sustains that such delimitation is rather unnecessary or even impossible, and, consequently, activities performed in those territories should be accessed in congruence with their respective objectives. The stalemate between these two schools of thought contributed to a contradictory reality: outer space constitutes the vertical frontier of national territories, which, even though finite, extend themselves above the surface of the Earth up to an undetermined altitude. Thus, a compromising solution is hereby proposed, in favor of the delimitation of the frontier between air space and outer space, by an international agreement, at 100 km above sea level, but contemplating regulation of passage rights for space objects during launchings and reentries, as long as those space activities are peaceful, conducted in accordance with International Law and respecting the sovereign interests of the territorial State.

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I Frontiers and International Law

Sovereignty has represented a key feature of International Law from the beginning. Sovereign rights are applicable domestically, as superior power over the population of a certain territory, as well as internationally, regarding independence and equality among nations.¹

Complete State jurisdiction, understood as the capacity to exercise every public function, encompassing jurisdictional, executive and adjudicatory counterparts, shall be circumscribed to the respective national territory, and must be provided in accordance with International Law. As explained by Malcolm N. SHAW, “*since such fundamental legal concepts as sovereignty and jurisdiction can only be comprehended in relation to territory, it follows that the legal nature of territory becomes a vital part in any study of international law. Indeed, the principle whereby a state is deemed to exercise exclusive power over its territory can be regarded as a fundamental axiom of classical international law.*”² Therefore, areas of contact between domestic legal systems, i.e., the political frontiers, corresponding to the uttermost corners of countries, should preferably be demarcated in order to avoid conflicts of jurisdiction.³ Clear, universally agreed delimitation of national territories should be encouraged in order to assure international stability and peaceful relations among States. Ian BROWNLIE explained that “*the legal competences of states and the rules for their protection depend on and assume the existence of a stable, physically delimited, homeland.*”⁴

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1. According to James Crawford, “*the term ‘sovereignty’ has a long and troubled history, and a variety of meanings. In its most common modern usage, sovereignty is the term for the ‘totality of international rights and duties recognized by international law’ as residing in an independent territorial unit – the State. It is not itself a right, nor is it a criterion of statehood (sovereignty is an attribute of States, not a precondition). It is a somewhat unhelpful, but firmly established, description of statehood; a brief term for the State’s attribute of more-or-less plenary competence*”. *The Creation of States in International Law*. 2. ed. New York, USA: Oxford University Press, 2006. p. 32.
 2. Malcolm N. Shaw. *International Law*. 5. ed. Cambridge, England: 2003. p. 409.
 3. In accordance with Victor Prescott and Gillian T. Triggs, “*political frontiers once separated neighboring countries and geographical interests in them is mainly concerned with their physical characteristics, their position, the attitudes and policies of the flanking states, the influence of the frontier on subsequent development of the cultural landscape and the way which boundaries were drawn within the frontier.*” *International Frontiers and Boundaries: Law, Politics and Geography*. Dordrecht, the Netherlands: Martinus Nijhoff, 2008. p. 30.
 4. Ian Brownlie. *Principles of Public International Law*. 6. ed. Oxford, England: Oxford University Press, 2003. p. 105.

Without clear boundaries, especially as far as strategic locations are concerned, the potential of dangerous international disputes raises dramatically.⁵

II Air Space vs. Outer Space

Differences between the legal regimes applicable to air space and outer space are of a fundamental order: while Air Law is based on considerations of sovereignty, Space Law overtly forbids any form of national appropriation.⁶

However, no clear solution to the delimitation of the air space/outer space frontier has been internationally provided up to this moment, even after decades of intense debate at the UNCOPUOS Legal Subcommittee. Therefore, the respective jurisdictions of such incommunicable systems should be, once and for all, clearly established.⁷

It should be recalled that, since the Legal Subcommittee's decisions require consensus of all member States, a single opposition is enough to obstruct any resolution or treaty proposing a definitive solution to the matter.⁸

Anyhow, discussions regarding the delimitation and definition of outer space have lately recovered relevance, due to a remarkable technological progress that, each day, narrows the distance between aeronautic and astronautic activities. Questions related to aerospace objects, sub-orbital flights, tether satellites and space tourism represent challenges to the current international legal order, justifying a careful review of proposals for delimitation of the so-called "final frontier". Besides, the growing exploitation of outer space, especially by private parties, demands rational use of this environment, in order to respect the common interests of all nations.

Considering the declarations presented by the diplomatic delegations before the UNCOPUOS throughout the years, it may be possible to infer that the voices favorable to delimitation are in a greater number than the ones against it.⁹ From the outside looking in, the international concern about the delimitation of the

5. Michel Fouchet. *L'Obsession des Frontières*. Paris, France: Librairie Académique Perrin, 2007.

6. Peter P. C. Haanappel. *The Law and Policy of Air Space and Outer Space: a Comparative Approach*. The Hague, the Netherlands: Kluwer Law International, 2003. p. 15.

7. Manfred Lachs asserted that "(...), with the growth of activities in outer space such a delimitation would offer clear advantages. It would prevent the misunderstanding or even friction to which uncertainty tends to give rise, facilitate international cooperation." *The Law of Outer Space*. Leiden, the Netherlands: Martinus Nijhoff, 2010. p. 5.

8. Bin Cheng. *Studies on International Space Law*. Oxford, England: Clarendon Pr, 1998. p. 163.

9. "Draft report of the Chair of the Working Group on the Definition and Delimitation of Outer Space", 50th Session, UNCOPUOS Legal Subcommittee: <www.oosa.unvienna.org/pdf/limited/c2/AC105_C2_DEF_2011_L01E.pdf>, accessed on 04.14.2011.

vertical frontier to State sovereignty seems to have regained momentum; indeed, scientific and commercial developments in aeronautic and space activities have proven capable of modifying traditional positions, as demonstrated by answers offered by States to the UNCOPUOS questionnaire regarding the topic.¹⁰ One should observe that Brazil has remained a strong advocate of a clear delimitation of outer space, presenting a coherent position since the early sessions of the Legal Subcommittee, through statements that emphasized the intrinsic differences between the legal regimes applicable to air space and outer space.¹¹

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10. Up to this moment, have presented formal answers to the refereed questionnaire the following States: the Netherlands, Tunisia, Denmark, Jordan, Austria, El Salvador, Algeria, Norway, United Kingdom, Mauritius, Czech Republic, Estonia, Bangladesh, Germany, Iraq, Serbia, Thailand, Azerbaijan, Qatar, Saudi Arabia, Belarus, Mexico, Brazil, Nicaragua, Ukraine, Iceland, Nigeria, Venezuela, Australia, France, Norway, Russian Federation and Turkey:
 <<http://www.oosa.unvienna.org/oosa/SpaceLaw/national/def-delim/question.html>>, accessed on 08.27.2012. In fact, the position presented by the United Kingdom in 2010 must be duly acknowledged: *“we anticipate that the development of space transportation systems functioning seamlessly between airspace and outer space, relying on lift to fly through the air for part of their flight profile, will create uncertainties about the legal regime applicable to them. In particular, the distinct liability regimes applicable to each may be conflicting. The United Kingdom is currently reviewing its licensing process and how it could relate to commercial human spaceflight, where this will likely be an issue. We recognize the need to avoid hybrid solutions and will seek a regulatory solution that provides seamless consideration and a degree of legal certainty for operators. (...) Although the United Kingdom is not considering the possibility of defining a lower limit of outer space and/or an upper limit of airspace, the United Kingdom may consider the possibility of enacting special international or national legislation relating to a mission carried out by an object in both airspace and outer space.”* A/AC.105/889/Add.8.
11. In its 2009 formal reply to the questions proposed by the Legal Subcommittee on this regard, the Brazilian position was laid upon three major considerations: *“1. The speed with which technological advances in space and aviation research are being made indicate that in the near future it will be possible to develop spacecraft with characteristics similar to those of an “aerospace object”, which could be defined as an object capable of flying and performing activities both in outer space and in airspace. 2. Taking that into account, aerospace objects should be regulated by international space law when in outer space and by international and national air law when in airspace. The main distinction between those two legal regimes is that in air law the principle of State sovereignty prevails while in space law it does not. 3. In order to adequately deal with situations arising from the development or utilization of aerospace objects (for example, activities in foreign airspace), it is necessary for the international community to take measures to establish universally accepted principles and parameters leading to the definition of boundaries between outer space and airspace.”* A/AC.105/889/Add.2.

The absence of treaty regulation consequently authorizes unilateral proposals of delimitation, through municipal legislation. The justification for countries to approve national regulation of space activities are abundant, and found in several conventions. For instance, in accordance to the Space Treaty of 1967, States are internationally responsible for every local endeavor regarding exploration and use of outer space, whether performed by governmental or non-governmental entities (Article VI). Therefore, every space faring nation should be encouraged to develop national space legislation.

After a careful review, one may realize that the vertical limit of national sovereignty, in relation to air space or outer space, has already been addressed by a small number of municipal rules, which are not only incipient but also conflicting in nature. Thus, it is import to resort to Comparative Law to achieve a comprehensive verification of those alternatives, in order to identify not only legal patterns but also to understand the reasons behind those laws.¹²

It shall be recalled, as observed by Francisco REZEK, that unilateral acts of States, including national legislation, are recognized as sources of International Law, even though not included in the list encompassed by article 38 of the Statute of the International Court of Justice.¹³

As pointed out by Dean REINHARD, even though some states have introduced legislation about Air Law after the Chicago Convention of 1944, dealing with the delimitation of the air space under their urisdiction, there is no international consensus regarding the vertical limit to national sovereignty.¹⁴

An important contribution to the topic was provided by Australia, which unilaterally established that its national space activities occur or may occur above 100 km of altitude, consequently implying a vertical limit of national sovereignty.¹⁵

12. As taught by Rudolf Schlesinger, “*unlike most other subjects in the Law school curriculum, Comparative Law is not a body of rules and principles. It is primarily a method, a way of looking at legal problems, legal institutions, and entire legal systems. By the use of the method of comparison, it becomes possible to make observations and to gain insights that would be denied to one whose study is limited to the law of a single country.*” *Comparative Law*. 6. ed. New York, USA: 1998. p. 2.

13. “*O ato normativo unilateral pode casualmente voltar-se para o exterior, em seu objeto, habilitando-se à qualidade de fonte de Direito Internacional na medida em que possa ser invocado por outros Estados em abono de uma vindicação qualquer, ou como esteio da licitude de certo procedimento. Tal é o caso das leis e decretos com que cada Estado determina, observados os limites próprios, a extensão do mar territorial ou da zona econômica exclusiva, o regime de seus portos, ou ainda a franquia de suas águas interiores à navegação estrangeira.*” Francisco Rezek. *Direito Internacional Público*. 11. ed. São Paulo, Brazil: Saraiva, 2008. p. 136.

14. “*In the years since the drafting of the Chicago Convention, States have taken different positions on the extent of vertical sovereignty and definitions of their national airspace. There is no consensus today.*” Dean Reinhardt. *The Vertical Limit of State Sovereignty*. Institute of Air and Space Law, McGill University. Montreal, Canada: 2005. p. 24.

However, the Australian delegation later reported to the UNCOPUOS that “*the Act still does not define “outer space” and the term is not defined in other Australian legislation. The 100-km altitude represents a practical clarification of where the Act applies. The 100-km altitude was not an attempt on Australia’s part to define or delimit “outer space”*”.¹⁶

It cannot be denied that the Australian Space Activities Act innovated in relation to countries as, for instance, Germany, that, when ruling about this subject, did not attempt to provide any clear indication of the boundaries between air space and outer space.¹⁷

Other States chose only to reaffirm sovereignty above their air space without, nevertheless, delimiting its maximum altitude. A relevant example can be found in the laws of the former USSR, later generally adopted by its successor, the Russian Federation.¹⁸

By the same token, deserves attention the Federal Constitution of Mexico, of 1917, in accordance to amendment of 1960, providing Mexican sovereignty in relation to the space above its territory, up to the extension determined by International Law (article 42, VI).¹⁹ Consequently, such stipulation made reference to an international rule still to be provided by international Space Law.

The aerodynamic lift approach²⁰ found some acceptance among States, as far as their national legislation is concerned. For instance, the recent Austrian’s Rule of Air, of 2010, in article 48, paragraph 2, “*defines the upper state boundary as the height at which aircrafts can no longer operate by aerodynamic lift but only according to Kepler’s laws*”.²¹

Recently, South Africa approved legislation regarding aviation and use of outer space that considered, at least apparently, the low standard of 18.5 km as the vertical limits of its national sovereignty.²² Such choice somehow seems similar

15. Space Activities Act, n. 34 1998-99, 1998.

16. A/AC.105/865/Add. 1.

17. Air Navigation Law, 1964 , art. 1(2).

18. Aeronautic Code, 1961, art. 1.

19. “*El espacio situado sobre el territorio nacional, con la extensión y modalidades que establezca el propio derecho internacional.*”

20. In accordance with the aerodynamic lift approach, the upper limits of our planet’s atmosphere should, in one way or another, represent Air Law’s jurisdiction, which is based on the premise that States have complete and exclusive sovereignty over the column of air above their territories. Beyond such a standard, outer space should commence, free from national claims.

21. “*Section 2 para. 48 of the Rule of the Air (Federal Law Gazette II No. 80/2010), a regulation implementing the Austrian Aviation Law, defines the upper state boundary as the height at which aircrafts can no longer operate by aerodynamic lift but only according to Kepler’s laws.*” Official answer from Austria, presented in 2011, to questionnaire prepared by UNCOPUOS Legal Subcommittee regarding national legislation about definition and delimitation of outer space. A/AC.105/C.2/2011/CRP.10.

22. Strategic Geographic Advantage Act, 2008.

to Paul FAUCHILLE's proposals of the early 20th century²³. Interestingly enough, a similar orientation can be found in Belarus, which considers that its national "*classified air space*" is located up to 20.1 km of altitude, for national security concerns.²⁴

One should also make reference to Regulation 428/2009 of May 5th, 2009, by the European Union Council, regarding export controls, that defined "*space qualified products*" as "*products designed, manufactured and tested to meet the special electrical, mechanical or environmental requirements for use in the launch and deployment of satellites or high altitude flight systems operating at altitudes of 100 km or higher*".

Occasional references to the vertical frontier may be found in legislation addressing specific space activities. For instance, the USA, that has presented a coherent position before the UNCOPUOS according to which no delimitation or definition is needed at this moment, approved regulation by its Air Force establishing that "*a USAF rated officer qualified to perform duties in space (50 miles above the earth's surface) who completes a minimum of one operational mission is eligible for the astronaut qualifier (pilot astronaut, CSO astronaut, observer astronaut, ABM astronaut, and flight surgeon astronaut)*".²⁵

It must be acknowledged that the termn "*space*" is currently defined by the United States Code, in the chapter regarding fiscal matters, as "*any area not within the jurisdiction (as recognized by the United States) of a foreign country, possession of the United States, or the United States, and not in international water*".²⁶

Additionally, a couple of American federal states have proposed or approved legislation defining the air space under their jurisdiction based on vertical

23. Paul Fauchille. *Le Domaine Aérien et Le Régime Juridique de les Aerostats*. Paris, France: Pendone, 1901.

24. "Law No. 156-3 of 5 May 1998, on objects belonging exclusively to the State, declares that the airspace above the territory of Belarus is the exclusive property of the State. As regards the issue of the definition and delimitation of outer space, however, Belarus, which embarked on outer space activities only recently, does not yet have separate domestic legislation relating to outer space but is currently developing legislation that will, *inter alia*, cover that issue. Current law divides the airspace of Belarus into two categories: classified and unclassified. Airspace below an altitude of 20,100 m is classified and flights within it are governed by domestic legislation: the Air Code and the Rules for the Use of Airspace adopted by Order No. 1471 of the Council of Ministers on 4 November 2006. Outside classified airspace (above an altitude of 20,100 m), which is considered outer space, the provisions of international agreements apply." A/AC.105/865/Add.4.

25. Instruction 11-42, 2003, item 2.2.

26. <<http://uscode.house.gov/>>, accessed on 09.02.2012.

limits, for instance, Virginia and New Mexico.²⁷ Such rules may eventually be challenged at the US Supreme Court, arguably due to violation of federal competence.²⁸

The new Federal Constitution of Ecuador, approved in 2008, claimed national sovereignty over the geostationary orbit's segment above its territory, suggesting a territorial limit of, at least, 36,000 km of altitude. In fact, its article 4 solemnly stated: "*the Ecuadorian State shall exercise rights in relation to the corresponding segments of the geostationary synchronous orbit, maritime spaces and Antarctica.*"²⁹ In similar terms, the Colombian Federal Constitution of 1991, in its article 101,³⁰ contemplated identical declaration, by including the geostationary orbit as part of the national territory, but with an interestingly remark: as long as there are no international rules preventing it.³¹ It is important to recall that both nations were part of the polemic Bogotá Declaration of 1976, by which equatorial States asserted that, since the Space Treaty of 1967 did not contemplate the delimitation of outer space, national appropriation of the geostationary orbit by the States underneath it did not violate International Law.³²

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27. Regarding the American State of Virginia, it was proposed that the term "suborbital flight" should be understood as those that take place up to 62.5 miles of altitude above sea level, during the preparation of amendments to the "Space Flight Liability and Immunity Act, of 2007, but the final wording did not incorporate such suggestion. <<http://leg1.state.va.us/cgi-bin/legp504.exe?071+sum+HB3184>>, accessed on 08.27.2012. On the other hand, the American State of New Mexico, in its "Gross Receipts and Compensating Tax", of 2007, defined outer space as anywhere above 60,000 feet of altitude from sea level. <<http://cfr.vlex.com/vid/52-229-gross-receipts-compensating-19871177>>, accessed on 08.27.2012.
28. Francys Lyall and Paul B. Laursen. *Space Law: a Treatise*. Farnham, England: Ashgate, 2009. p. 160.
29. "El Estado ecuatoriano ejercerá derechos sobre los segmentos correspondientes de la órbita sincrónica geoestacionaria, los espacios marítimos y la Antártida."
30. "También son parte de Colombia, el subsuelo, el mar territorial, la zona contigua, la plataforma continental, la zona económica exclusiva, el espacio aéreo, el segmento de la órbita geoestacionaria, el espectro electromagnético y el espacio donde actúa, de conformidad con el Derecho Internacional o con las leyes colombianas a falta de normas internacionales."
31. Jairo A. Becerra Ortiz. "A Survey of Colombia's New Outer Space Policy: Reforms in Colombian Law", *Acta Astronautica*, Vol. 63, n. 1-4. Washington, USA, July-August 2008. p. 560/563.
32. By the "Bogotá Declaration", of December 3rd 1976, several equatorial States claimed sovereignty over the geostationary orbit, due to its strategic importance, particularly as far as telecommunications are concerned. Said instrument, in which Brazil took part of the negotiations but later denied being bound to, represented the position of several developing countries crossed by the Equator line. It was also signed by Colombia, Congo, Ecuador, Indonesia, Kenya, Uganda and Zaire.

The present scenario, based on Comparative Law methods, observing municipal legislations in its plural and true colors in search of alternatives for a future common solution, shows that national legislators adopted different criteria to determine the vertical extension of their State's sovereignty. Those few that included, direct or indirectly, a clear boundary to national air space, vary from the ones that were only concerned with the reasonably low altitude where commercial aviation is conducted to those that extended national sovereignty up to the most valuable orbits, including the geostationary one.

In conclusion, one may infer that the municipal provision of the vertical limit of State sovereignty, whenever provided, leans towards local interests – what should come as no surprise, considering the strategic importance of air and space activities. Unless an international provision is agreed in that regard, it seems reasonable to foresee a future, complex scenario where the border of air space and outer space can differ from one country to another, presenting amazing challenges to international cooperation and hindering the progress of space activities. If the Law of the Seas may serve as an indicator, as far as national limits of the territorial sea are concerned, universal delimitation should always prevail upon local and unilateral solutions, for the benefit of peaceful international relations.

III Towards a Compromising Proposal

A clear delimitation of the frontier between air space and outer space is hereby advocated, through a compromised solution that contemplates features of both the “functionalist” and “spatialist” approaches in a single and comprehensive legal regime, assuring legal security for activities conducted in both realms. First and foremost, it is recognized the necessity of providing a clear legal standard of altitude for delimitation of the frontier between air space, subjected to exclusive State sovereignty, and outer space, that rests free from sovereign appropriation and open for international use and exploration.

This position is justified in order to safeguard one of the most important Space Law principles, that is, the prohibition of national claims over outer space, including orbital positions and celestial bodies. In a seminal study, Armand D. ROTH acknowledged that such principle depends on an effective identification of the space environment.³³ Until proper delimitation is commonly agreed, national claims that affect space orbits and orbital positions may be presented, as exemplified by the referred Bogotá Declaration of 1976.

33. “*Le danger de revendications sur l'espace extra-atmosphérique ne saurait être exclu en l'absence de délimitation de ce dernier. Le principe de non-appropriation ne déploie ses effets que dans un cadre spatial qu'il convient de préciser*”. Armand D. Roth. *La Prohibition de l'Apropriation et les Regimes d'Accès aux Espaces Extra-Terrestres*. Paris, France: Presses Universitaires de France, 1992. p. 93.

Besides, as far as international liability for damage caused by space objects is concerned, the 1972 Convention³⁴ contemplated a double standard that is contingent upon the place where the damage occurs. If caused on the surface of the Earth or to an aircraft in flight, the Launching State shall bear absolute liability.³⁵

On the other hand, if the damage is produced by a space object elsewhere than on the surface of the Earth to other space objects or to persons or property on board such space objects, liability shall be determined by the occurrence of fault.³⁶

Notably, there is an intrinsic link with the “*locus in quo*”, i.e., the place of damage, for determination of the liability regime concerning harm produced by space objects.³⁷

The border between air space and outer space should be based on an arbitrary limit, established by an international instrument (favorably a treaty), in order to assure legal security for aeronautic and space activities and to avoid international disputes. The standard of 100 km of altitude from sea level is hereby advocated, indeed a mark that has often been suggested by publicists³⁸ and delegations before the UNCOPUOS,³⁹ since it represents a singular zone

34. Convention on International Liability for Damage Caused by Space Objects.

35. “A launching State shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the Earth or to aircraft in flight” (Article II).

36. “In the event of damage being caused elsewhere than on the surface of the Earth to a space object of one launching State or to persons or property on board such a space object by a space object of another launching State, the latter shall be liable only if the damage is due to its fault or the fault of persons for whom it is responsible” (Article III).

37. “Elle [la Convention de 1972] institue deux régimes différents de responsabilité ayant trait aux activités qui se déroulent dans l’espace extra-atmosphérique, en fonction de la localisation du dommage considéré. Elle distingue en cela les dommages occasionnés à autrui à la surface de la Terre et ceux qui sont occasionnés dans l’espace ou sur un corps céleste.” Jean-Paul Pancracio. *Droit International des Espaces*. Paris, France: Armand Colin, 1997. p. 241.

38. For instance: I. H. Ph. Diedericks-Verschoor. *An Introduction to Space Law*. 2. ed. Dordrecht, the Netherlands: Kluwer Academic Publishers, 1999. p. 21; Robert F. A. Goedhart. *The Never Ending Dispute: Delimitation of Air Space and Outer Space*. Paris, France: Frontières, 1996. p. 51; Gennady M. Danilenko. “The Boundary Between Air Space and Outer Space in Modern International Law: Delimitation on the Basis of Customary Law”. *Proceedings of the Twenty-Sixth Colloquium on the Law of Outer Space*. IISL, Budapest, 1983. p. 74; Andrzej Górbiel. *Legal Definition of Outer Space*. Lodz, Poland: Uniwersytet Łódzki, 1980. p. 73/74.

39. It is important to mention the proposals presented by the USSR: A/AC.105/C.2/L.121, 1979 and A/AC.105/C.2/L.139, 1983. For a comprehensive review of the current position of the Russian Federation on that matter: A/AC.105/889/Add.10.

where aerodynamic lift decreases to critical levels and where the lowest peri-gees attainable by space objects in orbit can reasonably be identified.⁴⁰

In addition to those features, that follow a “spatialist” logic, it is also proposed the international regulation of passage rights for space objects, applicable during launchings and reentries, irrespective of the success of their missions. Such element is, in contrast, connected to the “functionalist” rationale, since it applies a distinctive legal regime for space activities whether carried out in air space or in outer space.

It must be reckoned that, for space objects to reach orbit and return from it, national or foreign air space ought to be overflowed, generating sensitive legal and political issues.⁴¹

In order to conceive proper rules regarding passage rights for space objects, one should take special consideration to the Space Treaty, of 1967, that established the right of every nation regarding free access to outer space. Hence, there is a reasonable justification for providing a body of internationally binding rules that grant passage rights for space objects, in order to safeguard the prerogative of any State, irrespective to the size of their territories or their geographical location, of developing their own launching capabilities.

But passage rights should only be applicable if such transit were to be deemed peaceful, as established by international standards, respecting the safety of the territorial State, which, otherwise, could be entitled to promote protective alternatives to safeguard its national interests in extreme cases.

Accordingly, it is hereby supported that the passage of space objects through foreign air space should not be considered peaceful if conducted in violation of International Law, disrespecting the sovereign rights of the territorial State or implicating unjustified dangers to its national security or the wellbeing of the local population and environment.

The concept of peaceful passage is envisioned as meaning “*non-aggressive*”, since that represents the interpretation which has prevailed throughout the years in relation to the Space Treaty.⁴²

By all accounts, any regulation of space objects’ passage rights must take into consideration the interests of the territorial State, especially in relation

40. Considering the recent progress of sub-orbital flights and the growing interest in private space activities, Frans G. Von Der Dunk defended that “*it is time to seriously reconsider whether we should not firmly but flexibly establish that the boundary between airspaces and outer space at an altitude of 100 km, following the considerable number of instances where this number has already been referred to. After all, what is wrong with a nice round figure?*” “The Sky is the Limit – but Where does it End?” *Proceedings of the Forty-Eighth Colloquium on the Law of Outer Space*. IISL, Fukuoka, 2005. p. 92.

41. Indeed, as observed by Armand D. Roth, “*la question est en réalité (...) plus politique que technique et la prolifération des théories en la matière semble inversement proportionnelle aux perspectives de solution*”. *La Prohibition de l’Appropriation et les Régimes d’Accès aux Espaces Extra-Terrestres*. Paris, France: Presses Universitaires de France, 1992. p. 99.

42. Robert F. A. Goedhart. *The Never Ending Dispute: Delimitation of Air Space and Outer Space*. Paris, France: Frontières, 1996. p. 15.

to national security. Up to this moment, one must acknowledge the fact that States may occasionally face the inconvenient reality of having their air space crossed by space objects on their way up, without enjoying proper support by Space Law, as far as their territorial privileges are concerned.

Therefore, the State whose air space is crossed by a foreign space object should have the right to receive prior information of those activities, in order to prepare any security measures that may be deemed necessary, including the closure of its air space for commercial flights. Routes for passage of foreign space objects during launching, whenever provided by the relevant territorial State, should also be acknowledged and respected. On the other hand, the territorial State should not be allowed to demand unreasonable requirements or charges for the crossing of its air space by foreign space objects, which could otherwise implicate in an indirect denial of international access to outer space.

One must recognize the challenges imposed by reentries on any regulation about passage rights of space objects, since, most of the times, due to technical imperatives, no control is held by the respective Launching State.⁴³ Nevertheless, even in those circumstances, the territorial State shall have the right to take emergency actions regarding its national air space, hereby proposed as extending up to 100 km of altitude above sea level, including the apprehension and destruction of the falling space object representing clear and immediate danger to people, property or the environment, in accordance with an international regulation that exempt responsibility for such last resort maneuvers.

Currently, there is no treaty provision regarding the possible defensive actions that the territorial State may be entitled to, in relation to uncontrolled space debris already crossing its air space. Many inoperative satellites, currently in orbit, have considerable mass and surface, enough for at least components or parts thereof to survive reentry. Some of them carry dangerous cargo, including toxic fuels and nuclear reactors.

Justification for emergency actions against free falling space objects, considering the current international regulation, could only be advocated based on factors that exclude responsibility,⁴⁴ for instance state of necessity or legitimate

43. Marietta Benkö and Kai-Uwe Schrogl (eds.). *International Space Law in the Making: Current Issues in the UN Committee on the Peaceful Uses of Outer Space*. Paris, France: Frontières, 1993. p. 116/121.

44. “A doutrina e a prática internacionais têm geralmente admitido que, em certos casos, devido a circunstâncias especiais, a responsabilidade do estado desaparece. Tais casos são: 1°. Aqueles em que o ato perde o caráter ilícito, transformando-se no exercício de um direito reconhecido; 2°. Aqueles em que o ato determinante da responsabilidade, apesar de ilícito em si mesmo, não pode acarretar as consequências naturais dos fatos ilícitos; 3°. Aqueles em que o decurso do tempo extingue a responsabilidade; 4°. Aqueles que representam a consequência direta do comportamento inconveniente e censurável do indivíduo lesado.” Hildebrando Accioly, G. E. do Nascimento e Silva and Paulo Borba Casella. *Manual de Direito Internacional Público*. 16. ed. São Paulo, Brazil: Saraiva, 2008. p. 362.

defence, mostly consuetudinary concepts based on general principles of Law, subject, therefore, to eventual conflicting interpretation.⁴⁵

When reviewing the legality of destruction of space objects that represent danger to the security of a certain State, not due to its activities *per se*, but because they are falling out of control and with a high chance of surviving reentry, Bruce A. HURWITZ defended that such measures could only be considered legal under the condition that “*such destruction does not itself result in more interference or in environmental contamination, and that it is carried out as a last resort*”.⁴⁶

Considering that this is an international problem, affecting each and every State, the solution should preferably be achieved through a new international convention, at least by amendment or protocol to the Space Treaty or the Chicago Convention, in order to guarantee proper legal security. Otherwise, other regulatory options, including a United Nations General Assembly Resolution, although internationally relevant, could not prevent questions related to the consolidation of a consuetudinary rule that authorizes passage rights for space activities. As a matter of fact, Robert F. A. GOEDHART concluded that “*at any rate, the passage of spacecraft through the air space of other States without prior consent, whether deliberate or resulting from miscalculation or misfire, would apparently constitute a violation of the territorial sovereignty of those States. The only exception to the rule would seem to be circumstances beyond the control of the launching State, if proved, upon a spacecraft’s reentry into the atmosphere. Planned reentry into the atmosphere and landing on the territory of another State without prior consent would thus not qualify as an exception in the sense just indicated.*”⁴⁷

By a careful treaty regulation, this new legal regime may be clearly drafted, assuring that the exploration of outer space continues to be conducted for the benefit of all mankind.

Likewise, by eliminating an important lacuna in Air Law and Space Law, the potential for international disputes would be minimized, safeguarding peace in international relations, undeniably the major objective of International Law.

45. It is important to recall that article 51 of the United Nations Charter, of 1945, presents a general provision regarding legitimate defence: “*nothing in the present Charter shall impair the inherent right of individual or collective self-defence if an armed attack occurs against a Member of the United Nations, until the Security Council has taken measures necessary to maintain international peace and security. Measures taken by Members in the exercise of this right of self-defence shall be immediately reported to the Security Council and shall not in any way affect the authority and responsibility of the Security Council under the present Charter to take at any time such action as it deems necessary in order to maintain or restore international peace and security*”.

46. Bruce A. Hurwitz. *The Legality of Space Militarization*. Amsterdam, The Netherlands: North-Holland, 1986. p. 151.

47. Robert F. A. Goedhart. *The Never Ending Dispute: Delimitation of Air Space and Outer Space*. Paris, France: Frontières, 1996. p. 20.

IV Concluding Remarks

The proposal herein offered intends to provide food for thought for studies on definition and delimitation of outer space, offering an alternative that not only pays tribute to past proposals but also includes particular conciliatory features.

It is strongly believed that only through a compromising alternative, that reaches for the common place between conflicting approaches, it may be possible to clarify the international rules applicable to air space and outer space.

As acknowledged by I. H. Ph. DIEDERICKS-VERSCHOOR, "*it would be quite wrong to think that demarcation in space is largely a matter for academic debate. On the contrary, a practical solution is required with ever increasing urgency*".⁴⁸ Undeniably, the development of human activities at upper atmospheric layers or lower Earth orbits is a current reality, as shown by endeavors encompassing suborbital flight and space tourism, representing a challenge to current international regulation.

It is strongly believed that the delimitation of the frontier between air space and outer space should be regarded not as a scientific but as a legal problem, with practical implications, due to inexorable progress of science. Therefore, a multilateral compromising legal solution should be pursued. Through debates, proposals may be discussed and alternatives may be endeavored. It is about time to revisit this important topic that, after so many years since the beginning of the Space Age, still awaits a final, clear and proper answer by the international community.

48. I. H. Ph. Diederiks-Verschoor. *An Introduction to Space Law*. 2. ed. Dordrecht, The Netherlands: Kluwer Academic Publishers, 1999. p. 17/18.