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Committee on the Peaceful Uses of Outer Space

Questions on suborbital flights for scientific missions and/or for human transportation

Note by the Secretariat

Addendum

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I. Introduction

1. At the fifty-fifth session of the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space, in 2016, the Working Group on the Definition and Delimitation of Outer Space agreed to continue to invite States Members of the United Nations and permanent observers of the Committee to provide their replies to the following questions ([A/AC.105/1113](#), annex II, para. 20 (c)):

(i) Is there a relationship between suborbital flights for scientific missions and/or for human transportation and the definition and delimitation of outer space?

(ii) Will the legal definition of suborbital flights for scientific missions and/or for human transportation be practically useful for States and other actors with regard to space activities?

(iii) How could suborbital flights for scientific missions and/or for human transportation be defined?

(iv) Which legislation applies or could be applied to suborbital flights for scientific missions and/or for human transportation?

(v) How will the legal definition of suborbital flights for scientific missions and/or for human transportation impact the progressive development of space law?

(vi) Please propose other questions to be considered in the framework of the legal definition of suborbital flights for scientific missions and/or for human transportation.

2. The present document has been prepared by the Secretariat on the basis of a reply received from the International Association for the Advancement of Space Safety.

III. Replies received from permanent observers of the Committee on the Peaceful Uses of Outer Space

International Association for the Advancement of Space Safety

[Original: English]
[6 December 2016]

Introduction

The Committee on the Peaceful Uses of Outer Space has been discussing the issue of the definition of and delimitation between airspace and outer space for more than five decades without reaching an agreement. The solution to this issue is also still pending in the agendas of academic forums and within the United Nations. The present reply examines the relationship between the issue of definition of and delimitation between airspace and outer space and the definition of suborbital flights for scientific missions and/or for human transportation. The main purposes of the present reply are (a) to present the theories and approaches that have already been proposed, both on this topic and the issue of the legal regime(s) that will respectively be applied to such flights, and (b) to set the ground for further questions, discussions and critiques.

Question (i): Is there a relationship between suborbital flights for scientific missions and/or for human transportation and the definition and delimitation of outer space?

With the launch of commercial human spaceflight, the notion of “suborbital flights” has emerged as referring to a peculiar category of craft that entails functional characteristics of both air and space vehicles.¹ This category of vehicles is similar to the National Aeronautics and Space Administration (NASA) X-15 airplane of the 1960s, but there are other developments with no wings based on capsule/rocket configuration. Those include Blue Origin’s New Shepard, named after Alan Shepard, who in May 1961 reached an altitude of 187 km on a suborbital flight with a Mercury capsule.

Commercial suborbital spaceflights are conducted using vehicles that reach an altitude of slightly more than 100 km, which is the theoretical line proposed by von Karman to separate the fields of aeronautics and astronautics. Such flights then re-enter the Earth’s atmosphere before achieving orbit around the Earth.² That property of suborbital vehicles, coupled with the lack of explicit delimitation between national airspace and outer space, creates a number of questions that pertain to the legal nature of such vehicles and the respective application of their legal regimes. The main question that remains is whether such a winged vehicle can be categorized as aircraft or spacecraft, or whether it would require the establishment of a new category of “aerospace vehicle” with the respective application of legal regimes that govern both aviation and space activities.

In August 2016, a definition of suborbital mission was introduced by the Range Safety Group (United States of America) through the publication of STANDARD 321-16, which is meant to reflect the common understanding of the term since the beginning of space missions. According to that definition, suborbital flight is defined as any flight of a launch vehicle, rocket or missile that does not achieve orbital insertion. A suborbital rocket is defined as a rocket-propelled vehicle intended to perform a suborbital mission whose thrust is greater than its lift for the majority of the rocket-powered portion of its flight. Such a definition is also included in the Code of the United States of America³ and the United States Code of Federal Regulations.⁴ Therefore, according to this definition, whether a vehicle, rocket or missile will achieve orbital or suborbital flight depends on trajectory and speed. A suborbital flight at an altitude of 100 km requires only 1.5 per cent of the energy required for an orbital flight.⁵ It should be noted that within the suborbital systems family there are two main types: systems intended for reaching high altitude with an almost vertical trajectory, and systems with high cross-range capability. For the latter, there are only conceptual studies in progress for human point-to-point transportation, but their economy is doubtful because development and operational costs are orders of magnitude higher than suborbital high-altitude systems, being that their complexity is closer to orbital vehicles.

The motivation to categorize some suborbital vehicles as space vehicles instead of high-altitude airplanes may be driven by marketing strategies and the desire to

¹ Although suborbital flights may follow take-off and landing procedures inherent to the nature of aircraft, they lack the energy necessary to reach orbital velocity.

² Ruwantissa Abeyratne, *Space Security Law* (Heidelberg, Germany: Springer, 2011), at 12.

³ United States of America, Office of the Law Revision Counsel, *United States Code*, Title 51, subtitle V, chap. 509, sect. 50906 (2010).

⁴ United States of America, *Code of Federal Regulations*, Title 14, chap. III (§ 401.5).

⁵ Caleb A. Scharf, “Basic rocket science: sub-orbital versus orbital”, 25 November 2015. Available at <https://blogs.scientificamerican.com/life-unbounded/basic-rocket-science-sub-orbital-versus-orbital>.

circumvent costly commercial aviation certification rules. The justification for categorizing such craft as a space vehicle based on the use of rockets is weak, given that rockets have been used in aviation for almost 90 years. Industry has therefore tried to make the point by using altitude and the purely theoretical von Karman line as justification for calling their systems space vehicles.

If we are to look at the issue from a legal perspective, it must first be taken into account that:

Both the existing regimes of air law and of space law were developed at a time when the technology for Earth-to-Earth aerospace movements did not yet exist. Thus, there is not yet a unified or integrated regime of aerospace law, and there appears to be much overlap and inconsistency between the regimes of air law and space law. At the outset, one must determine which regime applies — air law, space law, or in some instances, both — and then identify the governing rules. The international legal regime governing air transport on issues such as liability, security, navigation and air traffic management are well developed, and set forth in various conventions, treaties and various “soft law” standards. Five multilateral space law instruments also define legal rights and duties of space objects and launching States. Yet it is unclear whether space vehicles fall under established principles of air law, and if they do, whether these laws follow them into space. Moreover, it is unclear where the legal limits of air space expire, and the regime of outer space begins, and vice versa.⁶

Currently, no explicit or generally accepted definition of suborbital vehicles has been established, neither at the national nor international level, by the commercial human spaceflight industry. Functional descriptions of the operations of such vehicles have instead been used to address the definition issue. Such a functional description is based on the incapacity of suborbital flights to achieve orbit due to their limited speed, since the maximum speed that they can reach is below orbital velocity.⁷ Any explanation of the lack of definition, therefore, should include two factors: the unresolved status of such vehicles (air or space vehicles) and the lack of demarcation and delimitation of outer space.

Those issues, however, are not merely topics of academic interest. As technology advances and allows States to improve suborbital technologies for touristic and transportation as well as scientific purposes,⁸ the resolution of those issues becomes critical. Recently, in June 2016, NASA selected Blue Origin, LLC, in Van Horn, Texas, United States, to integrate and fly technology payloads near the boundary of space on their New Shepard suborbital spacecraft in support of NASA’s Flight Opportunities Program, while Virgin Galactic recently began glide tests with its second SpaceShipTwo.

Such developments reveal the dire need to agree upon a specific definition of suborbital flight and to attribute a specific legal nature to suborbital vehicles.

The uncertain delimitation between airspace and outer space has many implications on the applicable laws that govern suborbital vehicles. The legal regimes that govern airspace and outer space are distinct, entailing a key difference: while airspace is an area to which sovereignty can be attributed, outer space falls outside the scope of any such claims.

⁶ Ram S. Jakhu, Tommaso Sgobba and Paul Stephen Dempsey eds., *The Need for an Integrated Regulatory Regime for Aviation and Space: ICAO for Space?* (Vienna, Springer-Verlag, 2011), p. 49.

⁷ Abeyratne, *Space Security Law*.

⁸ See [A/AC.105/C.2/2010/CRP.9](#), p. 1.

Article I of the Convention on International Civil Aviation (hereafter the “Chicago Convention”) gives States the right to extend “complete and exclusive” sovereignty over the airspace above their territory, whereas article II 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 (hereafter the “Outer Space Treaty”) provides that outer space “is not subject to national appropriation by claim of sovereignty”. In addition, liability in space law pursuant to the Outer Space Treaty and the Convention on International Liability for Damage Caused by Space Objects is vested in the launching State; liability in air law pursuant to the Convention for the Unification of Certain Rules Relating to International Carriage by Air (Warsaw Convention) and the Convention for the Unification of Certain Rules for International Carriage by Air (Montreal Convention) is vested in the airline or aircraft operator.⁹

Such a difference in the concept that governs airspace and outer space cannot lead to an integrated solution, unless the international community achieves consensus on the issue of delimitation. It is for this reason that the relationship between suborbital flights and the delimitation of outer space needs to be defined.

Question (ii): Will the legal definition of suborbital flights for scientific missions and/or for human transportation be practically useful for States and other actors with regard to space activities?

Agreeing on a definition of what suborbital flights are and what they consist of would provide legal certainty to various aerospace actors, the two main categories being public (governmental) and private space actors. The main impacts of such a definition would be on the determination of which registration regime would be followed (depending on how suborbital flights are defined) and on the level of responsibility that would apply in each case. Three possible definitions can be proposed with regard to the nature of suborbital space vehicles: they could be defined as aircraft, as space craft or as hybrid vehicles.¹⁰ The definition of such vehicles would not only impact the vehicles but also the issue of delimitation between airspace and outer space. The traditional theories on both issues will be discussed in the next question, together with some more recent proposals.

First and foremost, defining suborbital flights will contribute to defining their legal regimes as well.¹¹ Aviation and space activities, including suborbital flights, require State authorization, registration and licensing before they can legally be undertaken.¹² These three elements apply to activities that involve suborbital flights. Hence, the clarification of the nature of such vehicles will therefore also clarify the regime to be used for authorization, registration and licensing.

Furthermore, the issue of responsibility of States would differ in each case. If suborbital flights were categorized as aircraft flights, and points of departure and arrival and the flight itself were all within the same territory, then domestic law would apply. However, if they were classified as aircraft flights, but with an international element, the provisions of public and private international air law would apply.

If suborbital flights were viewed as space flights, however, the international responsibility of States would be completely different because of the specificities of

⁹ See Paul Stephen Dempsey, “Liability for Damage Caused by Space Objects in International and National Law”, *Annals of Air and Space Law*, vol. XXXVII (2012).

¹⁰ Stephan Hobe, Gérardine Meishan Goh and Julia Neumann, “Space tourism activities: emerging challenges to air and space law”, *Journal of Space Law*, vol. 33, No. 2 (2007), pp. 359-373.

¹¹ Frans G. von der Dunk, ed., *National Space Legislation in Europe: Issues of Authorization of Private Space Activities in the Light of Developments in European Space Cooperation*, vol. 6, Studies in Space Law Series (Leiden, the Netherlands, Martinus Nijhoff Publishers, 2011), p. 264.

¹² See, for example, article VI of the Outer Space Treaty.

space law. Article VI of the Outer Space Treaty would apply and States would bear responsibility in a direct manner even for the actions of private space actors, despite the latter not acting as “organs” of the State.¹³

On the other hand, if we accept that suborbital flights constitute a completely different type of international flight that does not fall within the scope of either air or space law regimes, then the State responsibility rules of public international law would prevail. Accordingly, States would bear international responsibility for the actions of private entities only if those entities act under the direction of the State (i.e., as State “organs”),¹⁴ on the basis of customary international law, which presupposes an “attribution” linkage between State and private actors before the actual attribution of the responsibility of the State.

The above is of great importance for private space actors that wish to engage in space activities involving suborbital vehicles. Depending on the applicable regime, activities that use suborbital flights would be more (or less) attractive for private actors. For example, more investment incentives would be created through the application of the space law regime as no attribution is needed for the responsibility of States to be established, whereas under general international law, private actors would not enjoy that additional layer of protection.

To conclude, the question that should be asked in defining “suborbital flights” is what the ultimate purpose is. What does the international community wish to achieve and promote through such flights?

However, although defining a priori “suborbital vehicles” would answer the above questions, the main issue that will still need to be answered is the definition and delimitation of outer space as such. If the latter is agreed upon beforehand, the definition of suborbital vehicles will only be an issue in determining what approach should be taken on the basis of delimitation.

Question (iii): How could suborbital flights for scientific missions and/or for human transportation be defined?

A series of possible approaches have been proposed for the definition of suborbital flights, some of which simultaneously address the issue of the definition and delimitation between outer space and airspace. There are two such approaches: the spatialist and the functionalist approaches, but others have also been proposed (most being subcategories of the two main ones).

One way to answer which regime of law applies is to ask what type of vehicle is being considered — is it an aircraft, or a space craft, or an aerospace vehicle? This is the functionalist approach to the problem. Another way is to ask where the object at issue is — is it in airspace, or in outer space, or does it traverse both. This is the spatialist approach to the question.¹⁵

The spatialist theory proposes the establishment of an arbitrary delimitation between airspace and outer space,¹⁶ not solely on the basis of scientific findings, as even they are not explicit with regards to delimitation.¹⁷ For that purpose, many altitudes have been proposed, the main being 100 km above the surface of the Earth (the location of

¹³ See article VI of the Outer Space Treaty.

¹⁴ *Official Records of the General Assembly, Sixty-sixth Session, Supplement No. 10 (A/66/10)*, chap. V, sect. E.1, art. 6, paras. 1 and 2.

¹⁵ Jakhu, Sgobba and Dempsey, eds., *The Need for an Integrated Regulatory Regime*, p. 50.

¹⁶ Gbenda Oduntan, *Sovereignty and Jurisdiction in Airspace and Outer Space: Legal Criteria for Spatial Demarcation* (New York: Routledge, 2012), p. 309.

¹⁷ Gbenda Oduntan, *Sovereignty and Jurisdiction in Airspace*.

the theoretical von Karman line).¹⁸ At that altitude, the atmosphere is so thin that aircraft wings cannot generate sufficient lift for flight, while a spacecraft cannot orbit because the atmospheric drag is excessive.¹⁹ According to annex 7 of the Chicago Convention, an aircraft is defined as “any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the Earth’s surface”. That definition was developed to exclude hovercraft, which operate over water, with the oversight of the International Civil Aviation Organization (hereafter “ICAO”). Such support cannot be provided above 100 km solely on the basis of the “reactions of the air” because of the reduced density of the atmosphere.²⁰ However, rocket engine exhaust does not need to press against the surface of the Earth to provide propulsion; rocket engines do well in the void of outer space. In addition to the proposed 100-km demarcation, many others have been presented, most ranging from 40 to 160 km.²¹

According to the spatialist theory, everything that operates below the hypothetical delimitation between airspace and outer space would qualify as aircraft whereas anything that operates above would qualify as spacecraft. What however would the approach be for suborbital vehicles that operate mainly within airspace and remain in outer space for less than 10 minutes before re-entering the Earth’s atmosphere? That question is answered by the second dominant theory, the functionalist approach.

The functionalist approach takes as a reference point the functions of the vehicles. In order to answer the question “Is it a spacecraft or an aircraft?”, the theory first answers the question “Do the vehicle’s functions resemble to those of an aircraft or of a spacecraft?”. According to the functionalist approach, the second question can be answered in a multifaceted manner and on the basis of the purpose of the vehicle’s mission, the vehicle’s design and licensing and the level of interactions with other aircraft or spacecraft.²² Specifically, functionalists believe that a suborbital vehicle should be classified as an aircraft when its inherent purpose pertains to aviation activities; respectively, it is a spacecraft when it serves space-related purposes. In other words, this approach does not consider the location of the vehicle as critical, but rather focuses on the purpose that it serves. Although activities, such as suborbital space tourism, would easily be classified under the category of space activities, the distinction is not that clear with all other types of suborbital flights, such as stratospheric balloon flights.

In order to categorize suborbital vehicles, functionalists also take into account the design and the licensing of the vehicle — in other words, the vehicle’s physical morphology.²³ The specificities of the design of each vehicle would, according to this approach, define its legal nature. As is apparent, the location of the vehicle is disconnected from its legal nature under this approach. The licensing procedures of the vehicle have also been proposed as a criterion in determining whether it is an aircraft or spacecraft. That proposal leads to absurd results since the choice of the

¹⁸ Ibid., p. 306.

¹⁹ [A/AC.105/942](#), p. 29.

²⁰ John Cobb Cooper, *Explorations in Aerospace Law, Selected Essays — 1946-1966*, Ivan A. Vlasic, ed. (Montreal, Canada, McGill University Press, 1968), p. 289.

²¹ [A/AC.105/1039/Add.2](#).

²² International Association for the Advancement of Space Safety, “The definition and delimitation of outer space and the safety of aerospace operations”, presentation made at the fifty-fifth session of the Legal Subcommittee, on 6 April 2016.

²³ Mark W. Bury, Assistant Chief Counsel for International Law, Legislation and Regulations Division, Federal Aviation Administration, “Interpretation of the Federal Aviation Administration’s aviation and space statutes”, letter dated 26 September 2013. Available at www.worldviewexperience.com/FAA-Announcement.pdf.

licensing category (as well as registration category) would logically follow its classification as air or space vehicle.

The last aspect of the functionalist theory (criterion of interaction with other air or space vehicles) shares common ground with the spatialist approach: it considers the criterion of whether collision risks are higher among aircraft or space craft according to the location within which the vehicle operates.

Another theory, which is closely linked to the spatialist approach, is the aerodynamic-lift theory, which proposes the demarcation between airspace and outer space to be 83 km above the surface of the Earth (or, more generally, between 80 and 90 km).²⁴ That proposal was made because aircraft functions cannot be maintained beyond that altitude, since the density of the atmosphere is not sufficient to support vehicles that have not achieved circular velocity (the air lift is almost nullified at that point).²⁵ The aerodynamic-lift theory has characteristics in common with the spatialist and functionalist theories. It considers the delimitation point as important but still uses a functional criterion (that of the possibility to undertake physical aircraft functions) in order to justify the delimitation and classification of the vehicles.

One more theory could be suggested, based on the suborbital mission definition in STANDARD 321-16 (see the response to question (i)). Were this theory to be followed, no univocal link between the altitude reached by a suborbital flight and airspace and outer space limit would exist. In the region between 18 km (upper limit of managed airspace) and 160 km (lower limit of practically sustainable orbital flights), known as “near space”, there are competing national security interests and launch operational needs. As long as such interests and needs are not clearly defined, the issue of delimitation will lack a clear answer. Instead a special regime for that region that recognizes some rights of the countries beneath would probably settle the matter.²⁶

To conclude, no theory or definition has been universally embraced yet about what a suborbital vehicle is. As a result, the issue of delimitation remains critical. Although until now the discussion has revolved around where such a demarcation line (airspace/outer space) would lie, the definition of a suborbital vehicle as neither aircraft nor spacecraft would imply the definition of a transition region with a specific legal “mixed” regime instead of a demarcation line.

Question (iv): Which legislation applies or could be applied to suborbital flights for scientific missions and/or for human transportation?

This question can only be answered after deciding on the legal nature of suborbital vehicles. Three possible answers could be valid: international and national air law, international and national space law, or possibly a mixture of both.

With regards to the international character of such flights (if and whenever their launch occurs in a territory different from their landing), the sources of international law would apply as per article 38, paragraph 1, of the Statute of the International Court of Justice, namely conventional law, custom and general principles of international law.

²⁴ Similarly the World Meteorological Organization has vaguely proposed as delimitation point “the unlimited part of the universe starting with the upper atmosphere and extending above the atmosphere”, see [A/AC.105/1112](#), p. 3.

²⁵ Cooper, *Explorations in Aerospace Law*, Vlasic, ed.

²⁶ Tommaso Sgobba, “International space governance”, presentation made at the fifty-third session of the Scientific and Technical Subcommittee, on 16 February 2016.

Consequently, if we accept that suborbital space vehicles belong to the family of aircraft, then public and private international law would apply (the Chicago Convention, all bilateral treaties of public international law, the Montreal and Warsaw Conventions and national legislation). National legislation would primarily apply in the case of national or domestic flights — that is, whenever the launch and landing are located within the territory of the same country.

In the case of a suborbital flight classified as a space flight, the following instruments of international space law of the United Nations would apply: the Outer Space Treaty of 1967, the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, the Convention on International Liability for Damage Caused by Space Objects, the Convention on Registration of Objects Launched into Outer Space, and the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies. In addition, general international law would apply in case outer space law remains silent on certain matters. This is rendered possible by means of article III of the Outer Space Treaty, which considers general international law applicable to space activities before a lacuna in space law as per the maxim *lex specialis derogat lex generali*:

“States Parties to the Treaty shall carry on activities in the exploration and use of outer space, including the Moon and other celestial bodies, in accordance with international law [...]”

As with aircraft classification, domestic legislation would be applicable in cases of high-altitude suborbital flights where the launching and landing territory are the same.

The last possible scenario would be the acceptance that suborbital vehicles share common characteristics with both aircraft and spacecraft. In that case, both regimes would successively apply, a solution that would create legal ambiguities, in particular with regards to registration and liability issues. The dual nature of the vehicles would require registration under both regimes, which would lead to the phenomenon of double registration, forbidden under both air and space law regimes.²⁷

Consequently, it should be noted that:

In instances where both regimes apply, there will be a certain amount of inevitable inconsistency. As commercial aerospace launches become more numerous, their use of airspace also inhabited by aircraft will proliferate, creating a need for defined rules of safety, security, navigation, and traffic control. The absence of effective “rules of the road” may result in collision, and a proliferation of space debris — the largest environmental threat to the development of space.²⁸

Question (v): How will the legal definition of suborbital flights for scientific missions and/or for human transportation impact the progressive development of space law?

The legal definition of suborbital flights would impact the progressive development of space law in the following positive ways:

(a) First and foremost, the legal definition of suborbital flights would reiterate the need to delve into the issue of delimitation between airspace and outer space and would provide an incentive for the international community, and probably the scientific community, to urge the achievement of consensus on the matter.

²⁷ Ruwantissa Abeyratne, *Convention on International Civil Aviation: A Commentary* (New York, Springer, 2013), pp. vii and 253.

²⁸ Joseph N. Pelton and Ram S. Jakhu, eds., *Space Safety Regulations and Standards* (Oxford, Butterworth-Heinemann, 2010), p. xxii.

Nevertheless, if the legal definition of suborbital flights takes place on the basis of a spatialist-oriented approach, delimitation will have to inevitably be discussed as a precursor to the definition of the vehicles.

(b) The benefit of such discussion would also be substantial with regard to the growth of commercial space activities and the interest of the private space sector in engaging in activities carried out through the use of suborbital vehicles. Indeed, not only private participation but also governmental encouragement of the private sector would benefit, since a definition of suborbital flights would provide legal certainty and would clarify the risks involved.

(c) Spacefaring nations would be aware of the responsibility regime or regimes governing suborbital flights and would authorize and license relevant activities in a more effective manner by establishing national procedures that would facilitate space activities related to suborbital flights.²⁹

(d) In the event that suborbital point-to-point flights are classified as aircraft, ICAO would expand its responsibilities over activities that cross the limits of airspace and extend into outer space. Assuming that ICAO would be the adequate body to regulate such flights, space law would benefit from the wisdom and expertise that ICAO has acquired in flight matters over decades. The regulations regarding environmental protection would also improve through the inclusion of relevant provisions for such flights.

(e) Even if suborbital flights were classified as spacecraft, a binding international legal instrument regulating the environmental impacts of such flights would have to be established, given the international character of the flights (if the launching and the landing point are in different States). Such an instrument would constitute the first step towards a binding environmental law governing the specificities of outer space activities.

(f) The international character of the flights would also promote international cooperation and advancement (one of the main objectives of space law and international law in general) if the benefits that such flights could have for humankind (from space tourism to fast international transportation of humans and international carriage of goods) are taken into account.

(g) Last but not least, legal certainty would also constitute a motivation for further technological advancement in the space industry, as it would signify legal support to the possibilities that technology can offer to humankind.

Need for a unified legal regime. Overall, one would say that the need to establish a legal regime providing unified rules comes as a natural consequence of the facts. The analysis quoted below sheds light on such a need:

Future transportation systems will be highly influenced by the legal regime in which they are developed. Commercial development of space would be much enhanced by clarity, stability and predictability of law. Lack of uniformity of law, and conflicting and overlapping laws will impair the market's interest in investment in space transportation, and the insurance industry's ability to assess and price risk. [...]

Probably the simplest, and most sensible initial effort would be for ICAO to amend its annexes to redefine aircraft to include aerospace vehicles, so that when they fly in airspace used by civil aircraft, the rules of safety and navigation are

²⁹ See Paul Stephen Dempsey, "National laws governing commercial space activities: legislation, regulation and enforcement", *Northwestern Journal International Law and Business*, vol. 36, No. 1 (2016).

the same. It could do so by amending the definition of an aircraft to include aerospace vehicles. It created the definition of aircraft, and amended it to clarify that air cushion vehicles were not within the Chicago Convention; ICAO could amend its annexes again to clarify that suborbital vehicles fall within the definition of “aircraft”. One potential definition that might be used as a model was that promulgated by the U.S. Congress in the Air Commerce Act of 1926: “any contrivance now known or hereafter invented, used or designed for navigation or flight in the air.” [...]

Alternatively, ICAO could promulgate a new annex 19 on “Space Standards”. There is precedent for this as well. Article 37 of the Chicago Convention vests in ICAO the authority to promulgate Standards and Recommended Practices [SARPs] as annexes to the Convention. It lists therein eleven specific areas to which ICAO is instructed to devote itself, mostly focusing on safety and navigation. Yet, since its creation, as air transport has grown and evolved, ICAO has focused on other areas not explicitly listed in Article 37, including, for example, the promulgation of wholly new annexes addressing environmental and security issues. Article 37 is sufficiently broad to permit such jurisdictional assertions, as it provides that ICAO may promulgate SARPs addressing “such other matters concerned with the safety, regularity, and efficiency of air navigation as may from time to time appear appropriate.” Some international regulatory body is needed to provide uniform standards for national certification of space launch systems and vehicles, and their navigation through airspace.

ICAO might also define the limits of airspace by amending an annex, though some may argue that such a change would require a new Protocol amending the Chicago Convention itself, or perhaps an entirely new multilateral convention. This is by no means a new proposal. As early as 1956, Professor John Cobb Cooper urged that the definition of airspace should be determined by the United Nations and that pertinent regulations should be promulgated by ICAO. Australian domestic law draws the boundary between airspace and outer space at 100 km. That seems a reasonable point of demarcation. [...]

Dr. Nandasiri Jasentuliyana has called for COPUOS to promulgate “Space Standards” similar to ICAO’s SARPs, and to draft a convention creating an international framework for space vehicles. Yet, for three decades, COPUOS has been unable to promulgate any multilateral legal instrument for ratification by States. If COPUOS is able to break its deadlock, so much the better. If not, as the United Nation’s arm for air transportation, ICAO should provide clarification on the issues of what is contemplated by aircraft, and what is contemplated by airspace, and then set about to provide standards of harmonization as SARPs, which member States would be obliged to follow. Under the Chicago Convention, member States are obliged, “to collaborate in securing the highest practicable degree of uniformity” on such issues, and to “keep its own regulations ... uniform, to the greatest possible extent,” with SARPs. [...]

The time has come for the international community to promulgate conventional international space laws with an eye to facilitating — and indeed, promoting — commercial activity in space. Space transportation would also be facilitated by harmonizing space laws with the prevailing rules of safety, navigation, security and liability applicable under air law. The public’s safety demands no less.³⁰

³⁰ Jakhu, Sgobba and Dempsey, eds., *The Need for an Integrated Regulatory Regime*, pp.61-64.

Question (vi): Please propose other questions to be considered in the framework of the legal definition of suborbital flights for scientific missions and/or for human transportation

1. What would the impact of the definition and classification of suborbital flights be on the promotion and development of space situational awareness policies/mechanisms, and what would the legal implications be?
 2. What would the definition of suborbital flights mean for space security policies, in particular with regards to cooperation at the international level?
 3. Given their scientific character and their close links to the objectives of space law, should suborbital flights for scientific missions have a different legal treatment than suborbital flights for human transportation?
 4. Would the definition of suborbital flights for scientific missions and/or for human transportation have an impact on Space Traffic Management regulations?
 5. Should the issue of the extension of sovereignty beyond airspace and into outer space be included as part of a discussion on the delimitation between airspace and outer space?
 6. What would the impact of the legal definition of suborbital flights for scientific missions and/or for human transportation be on the development of international environmental law, and what is the role of ICAO in these discussions?
 7. Would the classification of suborbital flights for human transportation as space flights render a discussion about the protection of human rights in outer space necessary?
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