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Decoding the Legal Regime Governing Sub-Orbital Flights

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ABSTRACT

The scientific community has clearly defined what sub-orbital flights are. However, the legal community has failed to do so. There is no clarity as to what laws shall govern these sub-orbital flights. There is no clarity as to what is a suitable definition for such flights. Recent socio-economic changes like the entry of private firms in the age of space exploration and tourism make it imperative that the law find a definition and legal regime to govern these flights to ensure clarity on issues like liability, passenger safety, and jurisdiction.

This paper analyses the various legal regimes that can govern sub-orbital flights and looks into the issue of how to determine which regime has jurisdiction over these flights. The problems associated with the various methods of determining jurisdiction and the overall regimes available for governing these flights are also looked into. The paper concludes with a proposal for a rudimentary legal regime that can govern sub-orbital flights.

I. INTRODUCTION

"The great acceleration of social and economic change, combined with that of science and technology, have confronted law with a serious challenge: one it must meet, lest it lag even farther behind events than it has been wont to do."

- ***Justice Manfred Lachs***[2]

The scientific community has generally defined Sub-orbital flight in terms of flights that fly at speeds below orbital velocity.[3] The legal community on the other hand, has not defined this specific type of flight. This has led to confusion over what set of laws have jurisdiction over these flights, aviation law, space law or a mix of both?[4] This legal lacuna was not an issue in

[1] Author is a student at NALSAR University of Law, India.

[2] North Sea Continental Shelf (Federal Republic of Germany v. Denmark/Netherlands), Judgment, 1969 I.C.J. Rep. 219, 230 (Feb. 20) (dissenting opinion by Lacks, J.).

[3] Adam Mades, what is the difference between orbital and Sub-orbital flight? (22 October 2020 9:00 AM), https://www.space.com/suborbital-orbital-flight.html.

[4] ESA, 'ESA's position on privately-funded suborbital spaceflight', (Oct. 22, 2020, 10:04AM), https://esamulti

the early ages of space exploration, when exploration of space was limited to states and not private entities.[5] However, this changed with the entry of private entities like Virgin Galactic and Deep Blue, engaging in Space Tourism.

It is the entry of private entities that calls for clarity with regards to the legal regime governing these flights to have clarity on issues like passenger safety, liability and traffic management. The legal regimes governing Outer Space and aviation tackle in a fundamentally different fashion owing to the fundamentally different assumptions these are based on so it is imperative that clarity on which laws apply is achieved.[6] While a few Countries like the US have taken a lead in making a legal regime to govern these flights,[7] countries are themselves of the view that domestic laws are only piecemeal solutions and binding international standards are the best method of ensuring a stable legal regime for sub-orbital flights.[8]

The question this paper seeks to solve is this very issue of which laws can govern sub-orbital flights. The scope of this paper lies in first decoding the various approaches to answering the question of which law should govern sub-orbital flights, critically analyse them, and then propose a rudimentary legal regime for governing these flights.

II. ANSWERING THE QUESTION OF JURISDICTION

The question of whether the law governing aviation, space or a mix of both, has jurisdiction

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media.esa.int/docs/gsp/Suborbital_Spaceflight_ESA_Position_Paper_14April08.pdf; Thomas Cheney & Lauren Napier, 'Policy Analysis: Air versus Space, where do Suborbital Flights Fit into International Regulation?' Journal of Science Policy & Governance, Vol. 7, Issue 1, August 2015; Louis de Gouyon Matignon, Space Tourism Legal Aspects (22 October 2020, 8:29 AM), https://www.spacelegalissues.com/space-law-space-tourism-legal-aspects;

[5] Joana Ribeiro Gomes, Tessaleno Campos Devezas, Mischel Carmen Belderrain, Maria Cristina Vilela Salgado, and Francisco Cristovão Lourenço de Melo, the road to privatization of space exploration: What is missing? (11Apr.2020,9:13AM), https://www.researchgate.net/publication/289635460_The_road_to_privatization_of_space_exploration_What_is_missing; Thomas Cheney & Lauren Napier, 'Policy Analysis: Air versus Space, where do Suborbital Flights Fit into International Regulation?' Journal of Science Policy & Governance, Vol. 7, Issue 1, August 2015;

[6] I.H.Ph. Diederiks-Verschoor, Similarities with and differences between air and space law, primarily in the field of private international law, in *Recueil Des Cours*, Collected Courses of the Hague Academy of International Law, 1981, III, Volume 172; Masson-Zwaan, Tanja, 'regulation of sub-orbital space tourism in Europe: A role for EU/EASA?' Air and Space law 35 no. 3 263-272, (2010); ESA, 'ESA's position on privately-funded suborbital spaceflight',(Oct.22,2020,10:04AM),https://esamultimedia.esa.int/docs/gsp/Suborbital_Spaceflight_ESA_Position_Paper_14April08.pdf; Dempsey, Paul Stephen and Manoli, Maria, Suborbital Flights and the Delimitation of Air Space Vis-À-Vis Outer Space: Functionalism, Spatialism and State Sovereignty (2017). Annals of Air and Space Law, Vol XII, 2017;

[7] Commercial Space Launch Amendments Act, Pub. L. No. 108-492, 118 Stat. 3974 (2004) (codified as sections of 49 U.S.C.).

[8] UK Government Review of Commercial Spaceplane certification and operations, Technical report, July 2014; Sara M. Langston, Suborbital Flights: A Comparative Analysis of National and International Law, 37 J. Space L. 299 (2011);

over sub-orbital flight can be broadly answered using two approaches, the spatialist approach and the functionalist approach.[9]

Understanding the Spatialist Approach

The spatialist approach is used to determine the jurisdiction on the basis of the location of the flight.[10] This means that if the flight is flying within the Earth's atmosphere over the sovereign airspace of some country, it is aviation laws that will govern the flight. This approach leads to a dual legal regime that ends up governing the flight. The regimes are applied depending on the location of the flight. This approach however, is one that is seen as something that is impractical because of a range of reasons.

The biggest obstacle to this approach is the issue of demarcation. There is no consensus in international law as to the point where the sovereign airspace of a country ends and the vast emptiness of Outer Space begins.[11] The lack of a demarcation means that it is impossible to point out where exactly a flight is located, which in turn leads to a failure to determine which legal regime shall have jurisdiction over sub-orbital flight.

While there have been several attempts to solve the demarcation issue by setting an altitude limit as to where space begins and the Earth's atmosphere ends,[12] critics point out that

[9] I.H.Ph. Diederiks-Verschoor & V. Kopal, An Introduction to Space Law 17-19 (3d rev. ed. 2008); Vernon Nase, Delimitation and the Suborbital Passenger: Time to End Prevarication, 77 J. Air L. & Com. 747, 749-750, (2012); Masson-Zwaan, Tanja, 'regulation of sub-orbital space tourism in Europe: A role for EU/EASA?' Air and Space law 35 no. 3 263-272, (2010); ESA, 'ESA's position on privately-funded suborbital spaceflight', (Oct. 22, 2020, 10:04AM), https://esamultimedia.esa.int/docs/gsp/Suborbital_Spaceflight_ESA_Position_Paper_14April08.pdf; Thomas Cheney & Lauren Napier, 'Policy Analysis: Air versus Space, where do Suborbital Flights Fit into International Regulation?' Journal of Science Policy & Governance, Vol. 7, Issue 1, August 2015; Roy Balleste, Worlds Apart: The Legal Challenges of Suborbital Flights in Outer Space, International Law and Politics [Vol. 49;10333 2017].

[10] Vernon Nase, Delimitation and the Suborbital Passenger: Time to End Prevarication, 77 J. Air L. & Com. 747, 749-750, (2012); Masson-Zwaan, Tanja, 'regulation of sub-orbital space tourism in Europe: A role for EU/EASA?' Air and Space law 35 no. 3 263-272, (2010); Thomas Cheney & Lauren Napier, 'Policy Analysis: Air versus Space, where do Suborbital Flights Fit into International Regulation?' Journal of Science Policy & Governance, Vol. 7, Issue 1, August 2015.

[11] I.H.Ph. Diederiks-Verschoor, Similarities with and differences between air and space law, primarily in the field of private international law, in *Recueil Des Cours*, Collected Courses of the Hague Academy of International Law, 1981, III, Volume 172; Masson-Zwaan, Tanja, 'regulation of sub-orbital space tourism in Europe: A role for EU/EASA?' Air and Space law 35 no. 3 263-272, (2010); ESA, 'ESA's position on privately-funded suborbital spaceflight', (Oct.22, 2020, 10:04AM), https://esamultimedia.esa.int/docs/gsp/Suborbital_Spaceflight_ESA_Position_Paper_14April08.pdf; Dempsey, Paul Stephen and Manoli, Maria, Suborbital Flights and the Delimitation of Air Space Vis-À-Vis Outer Space: Functionalism, Spatialism and State Sovereignty (2017). Annals of Air and Space Law, Vol XII, 2017;

[12] Roy Balleste, Worlds Apart: The Legal Challenges of Suborbital Flights in Outer Space, International Law and Politics [Vol. 49;10333 2017]; Dempsey, Paul Stephen and Manoli, Maria, Suborbital Flights and the Delimitation of Air Space Vis-À-Vis Outer Space: Functionalism, Spatialism and State Sovereignty (2017). Annals of Air and Space Law, Vol XII, 2017; Rafael Moro-Aguilar, National Regulation of Private Suborbital Flights: A Fresh View, FIU Law Review, [Vol. 10:679 2015]; Sara M. Langston, Suborbital Flights: A Comparative Analysis of National and International Law, Journal of Space Law, [VOL. 37, 2011]; David Lefran ,Cois, The Suborbital Pilot's Ground School Manual 11, 14 (2012); von der Dunk, Frans G., "Beyond What? Beyond Earth Orbit? . . . ! The Applicability of the Registration Convention to Private Commercial Manned

spatialist solutions to the issue of demarcation in the form of setting up an altitude ceiling are impractical because there is no political will to solve the issue of demarcation in this manner.[13] To understand why countries do not want to solve the issue of demarcation of Earth and Outer Space, one must understand the fundamentally different concepts on which the legal regimes governing aviation and Outer Space are based on. Aviation law is based on the concept of sovereignty with the airspace of a country being recognised as its sovereign territory over which it can exercise complete control.[14] Space law on the other hand, is based on the concept of communal ownership, with the Outer Space Treaty explicitly stating that no one country can claim ownership of Outer Space.[15] Accordingly, when there is uncertainty as to where aviation law stops applying and where space law begins, countries can engage in high altitude espionage and defend claims of violation of the territorial sovereignty of another state by taking the defence that the flight was taking place in Outer Space where no country can claim sovereignty. This was a technique applied throughout the cold war.[16] This duality provides an incentive to countries to not solve this issue. The issue of demarcation however, is not limited to the spatialist approach alone and plagues the functionalist approach as well. However, the functionalists have a solution to the issue of demarcation in a manner that avoids political pitfalls and this solution shall be discussed in detail under the functionalist approach.

Apart from the issue of demarcation, the spatialist approach is plagued with several other issues. One of these issues is that the spatialist approach being adopted will result in a dual legal regime consisting of both aviation laws and space laws governing the sub-orbital flight contingent on the location of the flight. A dual legal regime is an impractical solution forcing

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Sub-Orbital Spaceflight" (2013). Space, Cyber, and Telecommunications Law Program Faculty Publications. 84.

[13] Thomas Cheney & Lauren Napier, 'Policy Analysis: Air versus Space, where do Suborbital Flights Fit into International Regulation?' Journal of Science Policy & Governance, Vol. 7, Issue 1, August 2015.

[14] I.H.Ph. Diederiks-Verschoor, Similarities with and differences between air and space law, primarily in the field of private international law, in *Recueil Des Cours*, Collected Courses of the Hague Academy of International Law, 1981, III, Volume 172; Masson-Zwaan, Tanja, 'regulation of sub-orbital space tourism in Europe: A role for EU/EASA?' Air and Space law 35 no. 3 263-272, (2010); Dempsey, Paul Stephen and Manoli, Maria, Suborbital Flights and the Delimitation of Air Space Vis-À-Vis Outer Space: Functionalism, Spatialism and State Sovereignty (2017). Annals of Air and Space Law, Vol XII, 2017;

[15] I.H.Ph. Diederiks-Verschoor, Similarities with and differences between air and space law, primarily in the field of private international law, in *Recueil Des Cours*, Collected Courses of the Hague Academy of International Law, 1981, III, Volume 172; Masson-Zwaan, Tanja, 'regulation of sub-orbital space tourism in Europe: A role for EU/EASA?' Air and Space law 35 no. 3 263-272, (2010); Dempsey, Paul Stephen and Manoli, Maria, Suborbital Flights and the Delimitation of Air Space Vis-À-Vis Outer Space: Functionalism, Spatialism and State Sovereignty (2017). Annals of Air and Space Law, Vol XII, 2017;

[16] Thomas Cheney & Lauren Napier, 'Policy Analysis: Air versus Space, where do Suborbital Flights Fit into International Regulation?' Journal of Science Policy & Governance, Vol. 7, Issue 1, August 2015, Dempsey, Paul Stephen and Manoli, Maria, Suborbital Flights and the Delimitation of Air Space Vis-À-Vis Outer Space: Functionalism, Spatialism and State Sovereignty (2017). Annals of Air and Space Law, Vol XII, 2017;

companies to comply with two different sets of laws, which is bound to disincentivize private companies from engaging with sub-orbital flights. This problem is exacerbated when two legal regimes are at odds with each other. Furthermore, a spatialist approach would also lead to Nuclear tipped ICBM's being governed by space laws when they are in their brief sub-orbital phase.[17] This would result in a violation of Article IV of the Outer Space Treaty, which explicitly bans the placing of nuclear weapons in Outer Space.[18]

Overall, the spatialist approach seems to suffer from too many problems to provide a viable solution to the conundrum of which laws shall govern sub-orbital flights.

III. UNDERSTANDING THE FUNCTIONALIST APPROACH

The functionalist approach can be used to answer the question to jurisdiction by either looking at the capabilities and features of the flight or by determining the overall purpose of the flight.[19] It is on this basis that there is a uniform legal regime that will apply regardless of where the sub-orbital flight is.

Several authors, nations and intergovernmental authorities like EASA[20] and the ICAO,[21] prefer an aviation law heavy functionalist approach towards solving the dilemma of which legal regime shall govern sub-orbital flights.

This stance is based on multiple arguments. First, all sub-orbital flights with the exception of VTVL's fit the definition of an 'aircraft' under the Chicago Convention. [22] Second, tendency of sub-orbital flights to spend maximum amount of time within the atmosphere of the Earth with a very brief period being spent in Outer Space[23] and third, the fact that aviation law has rich jurisprudence with respect to issues like liability and passenger safety as opposed to the

[17] Jaganath Sankaran Limits of the Chinese Antisatellite Threat to the United States, Strategic Studies Quarterly, Winter 2014); Dempsey, Paul Stephen and Manoli, Maria, Suborbital Flights and the Delimitation of Air Space Vis-À-Vis Outer Space: Functionalism, Spatialism and State Sovereignty (2017). Annals of Air and Space Law, Vol XII, 2017;

[18] Article IV, 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, 610 UNTS 205, 18 UST 2410, TIAS No 6347, 6 ILM 386 (entered into force on 10 October 1967) [Outer Space Treaty].

[19] Vernon Nase, Delimitation and the Suborbital Passenger: Time to End Prevarication, 77 J. Air L. & Com. 747, 749-750, (2012); Thomas Cheney & Lauren Napier, 'Policy Analysis: Air versus Space, where do Suborbital Flights Fit into International Regulation?' Journal of Science Policy & Governance, Vol. 7, Issue 1, August 2015; Roy Balleste, Worlds Apart: The Legal Challenges of Suborbital Flights in Outer Space, International Law and Politics [Vol. 49;10333 2017];

[20] ESA, 'ESA's position on privately-funded suborbital spaceflight', (Oct. 22, 2020, 10:04AM), https://esamultimedia.esa.int/docs/gsp/Suborbital_Spaceflight_ESA_Position_Paper_14April08.pdf.

[21] Committee on the Peaceful Uses of Outer Space, Concept of Suborbital Flights: Information from the International Civil Aviation Organization (ICAO), (19 March 2010), A/AC.105/C.2/2010/CRP.9.

[22] Chicago Convention, Annex 7.

[23] ESA, 'ESA's position on privately-funded suborbital spaceflight', (Oct. 22, 2020, 10:04AM), https://esamultimedia.esa.int/docs/gsp/Suborbital_Spaceflight_ESA_Position_Paper_14April08.pdf; What's the difference between orbital and Sub-orbital flight, https://www.space.com/suborbital-orbital-flight.html.

nebulous space law.[24] That is not to say that this approach does not suffer from any problems per se. There are multiple problems with this approach. First, the Montreal Convention, which deals with the important issue of air carrier liability, only applies when there is flight involving two or more states[25] and sub-orbital flights over countries like the US have no reason to enter the sovereign air space of another country and second, authors point out that the aviation law is not equipped to deal with an issue as complex as sub-orbital flights and organisations like the UNCOPUOS are better equipped to deal with such flights.

A space law approach on the other hand, is not free from problems either. None of the treaties governing Outer Space define the term 'space object' in a manner that provides clarity with respect to the question of sub-orbital flights. However, the biggest problem with a space law heavy approach is the application of the registration convention to sub-orbital flights. Article II of the convention states that it only applies to those 'space objects' launched into 'earth orbit or beyond'.[26] The failure of application of the registration convention to sub-orbital flights leads to an issue of states being unable to exercise their jurisdiction over these flights because Article VIII of the Outer Space Treaty states that the states can only exercise jurisdiction over objects which they have registered in accordance with the registration convention.[27]

The problem of lacklustre definitions plagues both the aviation law heavy and space law heavy approach. Even under an aviation law heavy approach, terms like 'sub-orbit', 'orbit' and 'outer space' need to be defined with clarity to be able to fully determine the capabilities and functions of the objects. This problem of lack of certain definitions is ultimately linked to the issue of demarcation because terms like 'orbit' and 'Outer Space' cannot be defined in vacuum and this leads to the functionalists delving into the question of demarcation as well.

Unlike the spatialist approach towards the issue of demarcation which is based on looking at the difference between Earth's atmosphere and Outer Space in geographical terms and is focused on solving the issue by putting an altitude ceiling to demarcate between Outer Space

[24] Thomas Cheney & Lauren Napier, 'Policy Analysis: Air versus Space, where do Suborbital Flights Fit into International Regulation?' Journal of Science Policy & Governance, Vol. 7, Issue 1, August 2015; Tanja Masson-Zwaan, Regulation of Sub-Orbital Space Tourism in Europe: A Role for EU/EASA? 35 AIR & SPACE L. 263, 265 (2010); Vernon Nase, Delimitation and the Suborbital Passenger: Time to End Prevarication, 77 J. Air L. & Com. 747 (2012).

[25] Article 1, The Convention for the Unification of Certain Rules for International Carriage by Air, May 28, 1999, ICAO Doc 9740 [hereinafter Montreal Convention].

[26] Article II, Convention on Registration of Objects Launched into Outer Space, Jan. 14, 1975, 28 U.S.T. 695 [hereinafter Registration Convention].

[27] Article VIII, Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, arts. VII, VIII, Jan. 27, 1967, 18 U.S.T. 2410 [hereinafter Outer Space Treaty].

and the atmosphere of Earth, the functionalist approach looks at the operational changes that the sub-orbital object or its participants experience when there is a transition from Earth's atmosphere to Outer Space.[28] This involves methods like determining whether the flight is able to fly using forces of aerodynamics or is it dependent on rocket propulsion and analysing biological changes like requirement of supplemental oxygen and bubbling body fluids, to determine where Earth's atmosphere ends and Outer Space begins.[29] While there is no guarantee that these solutions will not run into the political pitfalls, this approach has greater chances of acceptance because the demarcation here is not set in stone and there is just enough uncertainty for countries to defend their activities by stating that their flight was unable to use aerodynamics to fly or the pilot needed supplemental oxygen to stay alive, which means that the flight was taking place in Outer Space and not over the sovereign airspace of another country. Under such an interpretation, states still get to bask in uncertainty while the private industry gets the basis on which it can know the line of demarcation between Outer Space and Earth's atmosphere to operate with certainty.

Definitions of the term 'orbit' is tackled by the functionalists in a similar manner, by viewing the orbit as not a geographical location but as a trajectory that is achieved by objects depending on their speed and direction.[30] The concept of orbit cannot be defined in terms of setting an altitude ceiling because the orbit is not a location but an elliptical or circular trajectory that an object needs to go around to complete.[31] Giving the concept of orbit a definition with geographical connotations would mean that objects like Deep space probes can be considered to achieve orbit when they have never travelled on such a trajectory.[32] It is also for this reason that the term 'Earth orbit and Beyond' in Article II of the Registration Convention needs to have an interpretation where the term 'beyond' is not seen to have geographical connotations but is seen in the operational sense of capable of achieving orbit

[28] Roy Balleste, Worlds Apart: The Legal Challenges of Suborbital Flights in Outer Space, International Law and Politics [Vol. 49;10333 2017]; David Lefran ¸Cois, The Suborbital Pilot's Ground School Manual 11, 14 (2012).

[29] Roy Balleste, Worlds Apart: The Legal Challenges of Suborbital Flights in Outer Space, International Law and Politics [Vol. 49;10333 2017]; David Lefran ¸Cois, The Suborbital Pilot's Ground School Manual 11, 14 (2012).

[30] Von der Dunk, Frans G., "Beyond What? Beyond Earth Orbit? . . . ! The Applicability of the Registration Convention to Private Commercial Manned Sub-Orbital Spaceflight" (2013). Space, Cyber, and Telecommunications Law Program Faculty Publications. 84.

[31] Von der Dunk, Frans G., "Beyond What? Beyond Earth Orbit? . . . ! The Applicability of the Registration Convention to Private Commercial Manned Sub-Orbital Spaceflight" (2013). Space, Cyber, and Telecommunications Law Program Faculty Publications. 84; Orbit, Britannica, http://www.britannica.com/EBcheckedItopic/431123/orbit (last visited Feb. 9, 2013) ("[O]rbit, in astronomy, path of a body revolving around an attracting centre of mass, as a planet around the Sun or a satellite around a planet.").

[32] Von der Dunk, Frans G., "Beyond What? Beyond Earth Orbit? . . . ! The Applicability of the Registration Convention to Private Commercial Manned Sub-Orbital Spaceflight" (2013).

but opted to not go on an orbital trajectory. Under a functionalist approach towards defining the term 'orbit', the term 'sub-orbit' will be defined as a flight that has a trajectory that cannot achieve orbit.[33] This is the approach that has been adopted by the US towards defining 'sub-orbital flights' in the Commercial Space law activities amendments, 2004.[34]

Once the demarcation issue is solved, there is sufficient ground the functionalist approach to be used for an aviation heavy approach considering the fact that sub-orbital flights fit the definition of an 'aircraft' under the Chicago Convention[35] and they spend maximum amount of time in the atmosphere of Earth.[36] Furthermore, the registration convention does not allow for consideration of sub-orbital flights[37] and international space law in general is underequipped to deal with private entities.[38]

Yet, aviation law still needs changes for there to be accommodation of sub-orbital flights. Specific definitions of terms like 'sub-orbital flights' is needed with specialised safety and liability regulations in accordance with the 6th annex of the Chicago Convention, which recognises the need for specialised definitions and laws for different types of aircraft.[39] The next part of the paper shall focus on providing a rudimentary legal regime which can govern sub-orbital flights.

IV. A RUDIMENTARY LEGAL REGIME GOVERNING SUB-ORBITAL FLIGHT

This rudimentary legal regime will be based on an aviation heavy functional approach. With the exception of VTVL's, sub-orbital flights ought to be classified as 'aircraft' under Chicago Convention.[40] Once classified as 'aircraft', there ought to be a specialised definition for 'sub-orbital flights' along the lines of the Commercial Space Law Activities amendment, 2004 as 'a vehicle, rocket-propelled in whole or in part, intended for flight on a suborbital trajectory, and the thrust of which is greater than its lift for the majority of the rocket-powered portion of

[33] Von der Dunk, Frans G., "Beyond What? Beyond Earth Orbit? . . . ! The Applicability of the Registration Convention to Private Commercial Manned Sub-Orbital Spaceflight" (2013).
[34] Commercial Space Launch Amendments Act, Pub. L. No. 108-492, 118 Stat. 3974 (2004) (codified as sections of 49 U.S.C.).
[35] Chicago Convention, Annex 7.
[36] ESA, 'ESA's position on privately-funded suborbital spaceflight', (Oct.22,2020,10:04AM), https://esamultimedia.esa.int/docs/gsp/Suborbital_Spaceflight_ESA_Position_Paper_14April08.pdf;What's the difference between orbital and Sub-orbital flight, https://www.space.com/suborbital-orbital-flight.html.
[37] Article II, Convention on Registration of Objects Launched into Outer Space, Jan. 14, 1975, 28 U.S.T. 695 [hereinafter Registration Convention].
[38] Thomas Cheney & Lauren Napier, 'Policy Analysis: Air versus Space, where do Suborbital Flights Fit into International Regulation?' Journal of Science Policy & Governance, Vol. 7, Issue 1, August 2015; Tanja Masson-Zwaan, Regulation of Sub-Orbital Space Tourism in Europe: A Role for EU/EASA? 35 AIR & SPACE L. 263, 265 (2010); Vernon Nase, Delimitation and the Suborbital Passenger: Time to End Prevarication, 77 J. Air L. & Com. 747 (2012).
[39] Chicago Convention, Annex 6.
[40] Chicago Convention, Annex 7.

its ascent.'[41] A definition along such lines would also require a definition of the term 'sub-orbit' or 'sub-orbital trajectory', which can also be defined along the lines of the Commercial Space Law Activities Amendment, 2004 as ' the intentional flight path of a launch vehicle, re-entry vehicle, or any portion thereof, whose vacuum instantaneous impact point does not leave the surface of the Earth.'[42] VTVL's will have to be an modified to include some capabilities of an 'aircraft' to ensure that they can be classified as 'aircraft' under the Chicago Convention.[43]

International space law needs to be amended as well to ensure that there is absolute certainty. The term 'Outer Space' needs to be defined in a functional manner depending on the functional changes experienced when there is a transition from Earth's atmosphere to Outer Space. The term 'Launching' needs to be defined in terms of a launch into 'Earth's orbit or beyond'. The term 'orbit' needs to be defined in the operational sense as "the gravitationally curved path of an object around a point in space," completing a 360° circular or ellipsoid trajectory around it."[44] Accordingly, there is complete certainty to ensure that there can be no confusion with regards to sub-orbital flights.

The Montreal Convention will have to be amended with an exception being made to the requirement of travel between more than one state for sub-orbital flights. A specialised body to look into safety regulations can be made under the ICAO, that is comprised of stakeholders ranging from countries, UNCOPUOS and private space tourism companies themselves to ensure that there can be a legal regime that covers all contingencies.

V. CONCLUSION

The purpose of this paper was to understand the various approaches towards creating a legal regime to govern sub-orbital flights, highlight the problems with the approaches and try to find solutions to the problems. For from being complete, the rudimentary legal regime is only a starting point to provide the direction in which the process of creating a legal regime to govern sub-orbital flights can begin. These solutions should be discussed with all

[41] Commercial Space Launch Amendments Act, Pub. L. No. 108-492, 118 Stat. 3974 (2004) (codified as sections of 49 U.S.C.).
[42] Commercial Space Launch Amendments Act, Pub. L. No. 108-492, 118 Stat. 3974 (2004) (codified as sections of 49 U.S.C.).
[43] Chicago Convention, Annex 7.
[44] Von der Dunk, Frans G., "Beyond What? Beyond Earth Orbit? . . . ! The Applicability of the Registration Convention to Private Commercial Manned Sub-Orbital Spaceflight" (2013). Space, Cyber, and Telecommunications Law Program Faculty Publications. 84; Orbit, Britannica, http://www.britannica.com/EBcheckedItopic/ 431123/orbit (last visited Feb. 9, 2013) ("[O]rbit, in astronomy, path of a body revolving around an attracting centre of mass, as a planet around the Sun or a satellite around a planet.").

stakeholders and implemented after thorough research is done on their feasibility.

It is about time the international community wakes up to the changes taking place in the field of science, and catches up to these changes.

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