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POSSIBLE SOLUTIONS TO THE REGULATION OF SUBORBITAL FLIGHTS

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I. INTRODUCTION

To date, no regulations have been adopted at the international and European levels for suborbital flights. This is due to the novel nature of suborbital vehicles. However, the international level of regulation is indispensable to providing uniformity and consistency for suborbital flight regulations, as well as to promoting the development of suborbital vehicles to the same extent in all countries.

The absence of such regulations has created uncertainty regarding the legislation applicable to commercial suborbital flights. In the case of an accident, it would be unclear what regime of liability should be applied: namely, if the procedure of liability would apply under space or aviation law. For example, it would be ambiguous if the damaged party could claim directly against the operator or if the State-to-State system should be applied. Other questions include whether the liability has limited or unlimited character, or whether a vehicle should be registered in a registry (and if so, in which one?). The absence of precise designation of frontiers between outer and air spaces can create unnecessary barriers for the development of the suborbital industry in the conditions of legal uncertainty. Furthermore, the absence of complete legal regulations deprives the customers and other participants of suborbital flights of due legal protection.

At the national level, to date, the United States has already adopted its own initial, albeit incomplete, regulations for its own

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suborbital flights.[1] Despite the fact that, specific regulations for suborbital flights are already provided in the US, suborbital vehicles are already in the process of being developed in several different (largely European) jurisdictions.[2] Moreover, companies from the suborbital industry in different countries have already signed agreements to launch their suborbital vehicles from spaceports located in the territory of another State. Consequently, even if a State is not home to companies that develop or produce suborbital vehicles, it will require certain rules to be in place to address issues that arise from suborbital activity.

Suborbital flights encompass features of both aviation and space flights. The appearance of the vehicle may resemble either an aircraft or a rocket.[3] Furthermore, the mechanisms of launch and landing copy mechanisms of aircraft and spacecraft: suborbital flights are launched vertically from an airplane or directly from a launch site using a rocket motor similar to spacecraft, then return to Earth, gliding in the atmosphere by gaining support from the reactions of the air, like an aircraft.[4]

A suborbital vehicle reaches an altitude of 80 or 100 km, remains in the zero gravity zone for a short period of time, and then returns to the Earth.[5] This means that the vehicle potentially crosses the boundary between the atmosphere and outer space, as spacecraft do. But unlike a spacecraft, the suborbital craft shortly returns to the Earth. As a result, it is unclear whether aviation law, space law, or a third distinct legal regime should apply to these flights. International law contains no classification of suborbital flights; their legal nature and the legal regime to which they are subject are ambiguous.

We propose to divide suborbital vehicles into four categories: space tourism suborbital vehicles, vehicles for point-to-point

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[1] *See*, *e.g.*, CONG. RSCH SERV., REGULATION OF COMMERCIAL HUMAN SPACEFLIGHT SAFETY: OVERVIEW AND ISSUES FOR CONGRESS (2025), https://www.congress.gov/crs-product/R48050.

[2] *See*, *e.g.*, Yi-Wei Chang et al., *A Study from Aviation to Suborbital Point-to-Point Transport and Tourism to Orbital Tourism*, 231 ACTA ASTRONAUTICA 93 (2025).

[3] *See* Jeff Foust, *Dawn Aerospace Sells Aurora Suborbital Spaceplane to Oklahoma*, SPACENEWS (June 12, 2025), https://spacenews.com/dawn-aerospace-sells-aurora-suborbital-spaceplane-to-oklahoma/. *Suborbital Launch Vehicles*, SKYRORA, https://skyrora.com/suborbital-launch-vehicles/ (accessed June 12, 2025).

[4] Stephan Hobe & Rada Popova, *Legal Aspects of Human Orbital and Suborbital Spaceflight*, 7-8 REACH 1 (2017).

[5] *Id*.

transportation, vehicles for scientific purposes, and vehicles for military purposes. This classification is based on the main criterion of the purpose of a flight; another subsidiary criterion is the presence or absence of consumers aboard. Consumers are envisaged to be present in space tourism suborbital vehicles and vehicles for point-to-point transportation.

We can highlight various approaches suggested by scholars, national and international authorities that aim to define a legal regime applicable to suborbital flights or a competent authority in charge of suborbital flight regulation.

One vehicle being categorized as a suborbital vehicle does not automatically imply that all such vehicles should be subject to a single legal regime. In theory, there may be different legal regimes for different sub-categories of suborbital flights.

This is the case for aviation law, which provides two legal regimes that are applicable to State aircraft and civil aircraft. These are distinguished by their purpose and by the actors involved (the last criterion is an auxiliary and additional one). Suborbital flights can also be divided into different categories according to their purpose, which may include space tourism, scientific operations, military operations, or transportation. In this regard, different legal regimes might constitute parts of one branch of the law, or suborbital flights might be subject to different areas of law.

We believe that each category of suborbital flights should be subject to different legal regimes due to the essential differences between them (although they do obviously have some features in common) that do not enable the same legal solutions to be applied to each category of suborbital flights.

II. Approaches to Applicable Law

A. Aviation Approach

This analysis will consider aviation law as applying to suborbital flights. In the context of this approach, a suborbital flight is seen as an air flight.

Aviation law could be adapted for suborbital flights with minor modifications, as it already applies to commercial flights. Nevertheless, the definition of "aircraft" would need to explicitly include suborbital vehicles. Furthermore, the International Civil Aviation Organization (ICAO) would need to amend Annexes 8, 10, 11, and 14

of the Chicago Convention to include suborbital flights in the systems of air traffic control. Interestingly, some academic experts suggest adopting a new Annex 20 intended to set "Space Standards."[6]

Furthermore, the meaning of international agreements regulating aviation law should be clarified and their interpretations changed as appropriate. Article 31(3)(a) of the 1969 Vienna Convention on the Law of Treaties (VCLT) states that "[a]ny subsequent agreement between the parties regarding the interpretation of the treaty or the application of its provisions may change an interpretation of a before signed agreement or its provision."[7]

By applying the aviation approach, the Radio Regulations of the International Telecommunications Union (ITU) could be expanded to include the regulation of suborbital flights to conform, particularly for traffic management and collision avoidance purposes,[8] since ICAO has already proceeded with the standardization of aeronautical mobile satellite services, which operate in outer space rather than in airspace.

In the event that aviation law were applied to suborbital flights, ICAO would play a significant role in the international regulation of these flights. This would be realistic in practice, as the Chicago Convention does not limit the competence of ICAO in regard to suborbital flights.[9] The preamble of the Chicago Convention stipulates that an objective of the convention is the assurance of the safe and orderly development of civil aviation "on the basis of equality of opportunity and [being] operated soundly and economically."[10] Furthermore, according to Article 44(a) of the Chicago Convention, one of the direct objectives of ICAO is to govern international civil

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[6] Tanja Masson-Zwaan & Rafael Moro-Aguilar, *Regulating Private Human Suborbital Flight at the International and European Level: Tendencies and Suggestions*, 92 ACTA ASTRONAUTICA 243, 249 (2013).

[7] Vernon Nase, *Delimitation and the Suborbital Passenger: Time to End Prevarication*, 77 J. AIR L. & COM. 747, 759-760 (2012).

[8] SEYEDEH MAHBOUBEH MOUSAVI SAMEH, SUBORBITAL FLIGHTS: SELECTED LEGAL ISSUES 114 (Institute of Air and Space Law Faculty of Law, McGill University, 2013) (quoting Jean-Bruno Marciacq et al., *Accommodating Sub-Orbital Flights into the EASA Regulatory System*, PROC. OF 3RD IAASS CONFERENCE—BUILDING A SAFER SPACE TOGETHER (2008)).

[9] Rafael Moro-Aguilar, *National Regulation of Private Suborbital Flights: A Fresh View*, 10 FLORIDA INT'L UNIV. L. REV. 679, 683 (2015).

[10] Convention on International Civil Aviation, Dec. 7, 1944, 15 U.N.T.S. 295 [hereinafter Chicago Convention], Preamble.

aviation in order to guarantee its "safe and orderly growth."[11] The objective of this Convention and the establishment of ICAO accordingly do not constitute a regulation of certain types of vehicles, but rather an assurance of safe and orderly aviation. Moreover, Article 37 of the Chicago Convention allows ICAO to adopt standards, recommended practices, and procedures that address "matters concerned with the safety, regularity and efficiency of air navigation as may from time to time appear appropriate."[12] This Article is designed to permit ICAO to address issues that may arise in the future following certain technological developments.[13] Consequently, based on this Article, suborbital flights related to air navigation could potentially be included in ICAO's scope.

In practice, to draft amendments to aviation law with the goal of making it completely appropriate for suborbital flights, a permanent working group within ICAO should be established.[14] At the same time, while suborbital flights contain the specific elements that refer to space activity, it would be preferable for ICAO to conduct its activity in collaboration with the Committee on the Peaceful Uses of Outer Space (COPUOS).[15] Given that amending the Chicago Convention (for example, Article 3 on civil and State aircraft of the said Convention, in order to include suborbital flights under the Convention's scope of application) would be a very long and complicated process,[16] it would be simpler to amend its Annexes to redefine aircraft.

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[11] *Id*. at art. 44.

[12] *Id*. at art. 37.

[13] SAMEH, *supra* note 8, at 114 (quoting Jonas Stankūnas & Vaidotas Kondroška, *Formation of Methodology to Model Regional Airspace with Reference to Traffic Flows*, 16 AVIATION 69, 70 (2012)).

[14] *Id*.

[15] SAMEH, *supra* note 8, at 252.

[16] Article 94 of the Chicago Convention, *supra* note 10, stipulates that:

> a. Any proposed amendment to this Convention must be approved by a two-thirds vote of the Assembly and shall then come into force in respect of States that have ratified such amendment when ratified by the number of contracting States specified by the Assembly. The number so specified shall not be less than two-thirds of the total number of contracting States.
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> b. If in its opinion the amendment is of such a nature as to justify this course, the Assembly in its resolution recommending adoption may provide that any state has not ratified within a specified period

At the European level, this means that suborbital flights should comply with the *acquis communautaire* of the European Union; in other words, suborbital flight should be in conformity with European air law. These rules are directly binding on all EU Member States. European law provides special requirements with respect to economic regulation, passenger protection and liability. It also covers external relations and infrastructure, particularly regarding the issues of safety and security.[17]

1. Space Tourism Suborbital Vehicles

If the aviation approach applies to space tourism suborbital vehicles, then space tourism suborbital vehicles should be subject to aviation law. Many commentators support this approach.[18] Vernon Nase justifies this position by noting that such vehicles spend most of their flight time in airspace.[19] André Farand, the head of the European Space Agency (ESA) Office of Legal Affairs related to launches and exploration, shares this opinion, calling the activities of suborbital vehicles in outer space "accessory activities" due to their minimal duration.[20] According to Jakhu, Dempsey and Sgobba, all rules of international aviation law can be applied (with certain modifications) to private space activities, including suborbital flights.[21] In their opinion, ICAO is an authority responsible for regulating all airspace industries.[22] These authors refer to the theory based on the period spent in airspace, or the approach based on the velocity of a flight, in order to designate the law applicable to such flights.

In addition to the opinions put forward by scholars, this approach was also initially maintained for space tourism suborbital flights by the legal sub-committees of ICAO and COPUOS in 2010.

> after the amendment has come into force shall thereupon cease to be a member of the Organisation and a party to the Convention.

[17] Moro-Aguilar, *supra* note 9, at 692.

[18] *See*, *e.g.*, RAM S. JAKHU, PAUL STEPHEN DEMPSEY & TOMMASO SGOBBA, THE NEED FOR AN INTEGRATED REGULATORY REGIME FOR AVIATION AND SPACE: ICAO xii (2011); Nase, *supra* note 7, at 766; Masson-Zwaan & Moro-Aguilar, *supra* note 6, at 112.

[19] Nase, *supra* note 7, at 767.

[20] *Id*.

[21] JAKHU ET AL., *supra* note 18, at [].

[22] *Id.* at xiii.

Subsequently, however, these authorities changed their opinion regarding this matter.[23]

Furthermore, at the European level, many officials of the European Union have also proposed that aviation law should be applied to suborbital flights.[24] Moreover, in its Bulletin no. 135 on space tourism from August 2008, the ESA proposed giving a primary role in the regulation of suborbital flights to the European Union Aviation Safety Agency (EASA).[25] This means that suborbital flights would be covered by the regulations of the European Union, which are stricter than those of international aviation law. However, these notes were made exclusively regarding suborbital vehicles, which do not constitute pure "rockets without wings."[26] The position adopted by these officials is more reminiscent of the integrated approach to the applicable law, as they do not claim competence for the outer space phase of a suborbital flight.[27] This position can be explained by the fact that any admission that all suborbital vehicles fall under the powers of EASA would potentially lead to an immense augmentation of EASA's responsibilities, since (contrary to US law) European aviation law also provides the system under which vehicles are certified.[28] Simultaneously, in September 2011, the European Commission suspended EASA's competence with respect to suborbital flights in order to establish a system of license issuance analogous to that provided in the United States.[29] Furthermore, some Member States have already expressed their desire to regulate these flights themselves.[30] In March 2023, EASA proposed to adopt guidance material on the specific temporary regulation for the testing of innovative technologies.[31] This proposal is

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[23] Masson-Zwaan & Moro-Aguilar, *supra* note 6, at 248.

[24] Moro-Aguilar, *supra* note 9, at 693.

[25] EUROPEAN SPACE AGENCY, *Space Tourism*, *in* BULLETIN 135 (2008), at 22, https://www.esa.int/esapub/bulletin/bulletin135/bul135c_galvez.pdf; Moro-Aguilar, *supra* note 9, at 692.

[26] Moro-Aguilar, *supra* note 9, at 692-693.

[27] *See* Tanja Masson-Zwaan & Steven Freeland, *Between Heaven and Earth: The Legal Challenges of Human Space Travel*, 66 ACTA ASTRONAUTICA 1602 (2010).

[28] Masson-Zwaan & Moro-Aguilar, *supra* note 6, at 251.

[29] Moro-Aguilar, *supra* note 9, at 694; Masson-Zwaan & Moro-Aguilar, *supra* note 6, at 252.

[30] Moro-Aguilar, *supra* note 9, at 679.

[31] *See* EUROPEAN UNION AVIATION SAFETY AGENCY, PROPOSAL FOR A ROADMAP ON HIGHER AIRSPACE OPERATIONS (2023), https://www.easa.europa.eu/en/document-library/general-publications/proposal-roadmap-higher-airspace-operations-hao.

intended to promote first private test flights in the EU. EASA further proposed to conduct scientific studies as well as legal and technical analysis in order to define if suborbital vehicles should be covered by aviation law, and consequently be placed under EASA's authority.[32]

With regard to the regulation of suborbital flights by States, this approach was applied until recently in certain European countries.[33] Moreover, under the Spanish draft law, suborbital flights are subject to a regime that appears to resemble the regime of aviation law in Spain.[34] This approach is currently also supported by the authorities in the United Kingdom,[35] who believe that the concept of "airplane" extends to cover suborbital vehicles.[36] In the opinion of Masson-Zwaan and Moro-Aguilar, the practice of States excluding the application of space law to suborbital flights may create customary law in the future;[37] i.e., this practice of States choosing to apply aviation law to suborbital flights may become an established international practice that creates an international obligation for other States.

In regard to the legal status of space tourism suborbital vehicles in aviation law, we believe that when applying the aviation approach to the legal status of space tourism suborbital vehicles, we should refer to such flights as falling under the same category as zero-gravity flights, which are also not engaged in scheduled international air services and are conducted primarily for entertainment purposes. Consequently, the same legal regime that applies to zero-gravity flights should also apply to space tourism suborbital vehicles: namely, the legal regime provided for non-scheduled air flights under Article 5 of the Chicago Convention. In other words, space tourism suborbital flights belong to the category of air flights that might be designated as conventional non-professional flights for tourism purposes (as opposed to scheduled regular air travel). In contrast to regular scheduled air services, pursuant to Article 5 of the Chicago Convention, a space tourism suborbital vehicle would

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[32] *Id*. at 42.

[33] For instance, suborbital vehicles are perceived as aircraft by the authorities of Great Britain, Sweden, and Belgium. *See* Moro-Aguilar, *supra* note 9, at 704, 709.

[34] *Id*. at 708.

[35] According to a report prepared by the UK Civil Aviation Authority (UK CAA) and assisted by the UK Space Agency (UKSA).

[36] Moro-Aguilar, *supra* note 9, at 703.

[37] Masson-Zwaan & Moro-Aguilar, *supra* note 6, at 246.

"have right to make flights into or in transit non-stop across [a State's] territory and to make stops for non-traffic purposes without the necessity of obtaining prior permission," unless a State requires "aircraft desiring to proceed over regions which are inaccessible or without adequate air navigation facilities to follow prescribed routes, or to obtain special permission for such flights" for safety reasons.[38] Furthermore, following Article 5 of the Chicago Convention, the space tourism suborbital vehicle "shall also be subject to the provisions of Article 7 [on cabotage], have the privilege of taking on or discharging passengers, cargo, [..], subject to the right of any [S]tate where such embarkation or discharge takes place to impose such regulations, conditions or limitations as it may consider desirable."[39]

Regarding national regulations, we may consider the example of France, which adopted a special law for parabolic flights called "Vols à Sensations" (Thrill-Seeking Flights) on February 8, 2012.[40] The law covers aircraft operations that are publicly advertised and that operate from point A to point A. Under the Thrill-Seeking Flights law, a safety analysis must be carried out regarding people on the ground and other aircraft in the vicinity. In France, however, human spaceflights are expressly excluded from the scope of regulation of the Thrill-Seeking Flights law by the French Space Operations Law no. 2008-518.[41] This is because space tourism suborbital vehicles and zero-gravity vehicles have different characteristics, since the latter, apart from offering a special type of flight that enables passengers to experience zero gravity, are very similar to other ordinary aircraft.

This approach presents certain advantages. First, it would make it simple for ICAO to integrate suborbital flights into the air transport traffic control system. Furthermore, the aviation approach allows for the registration of suborbital vehicles in the

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[38] Chicago Convention, *supra* note 10, at art. 5.

[39] *Id*.

[40] Arrêté du 8 Février 2012 Modifiant L'Arrêté du 24 Juillet 1991 Relatif Aux Conditions D'Utilisation des Aéronefs Civils En Aviation Générale Et l'Arrêté du 28 Février 2006 Relatif au Certificat de Navigabilité Restreint s'Aéronef de Collection (CNRAC)

[41] Jerôme Crevatin & Garrett Smith, *Integration of Suborbital Spaceflight at a Commercial Airport in France*, 4 NEW SPACE 212, 213 (2016) (citing French Space Operations Law no. 2008-518 (Jun. 3, 2008)).

register of aircraft, which would be impossible if such vehicles were governed by space law.[42]

Another advantage of applying the aviation approach is the capacity of aviation law to guarantee the required protection of passengers, which incorporates a system of carrier liability and obligations regarding insurance. In the opinion of Nase, an agreement between the air carriers of the International Air Transport Association (IATA) could serve as a model for the regulation of suborbital flights.[43] However, although complementary protection for passengers (or more precisely, for tourists) is necessary, to date, most space tourism suborbital flights are national. Consequently, the international conventions stipulating the liability of carriers under aviation law cannot be strictly applicable to them.[44] It would also be inadvisable to demand the same level of liability from a suborbital carrier owing to the increased risks associated with suborbital flights, as the imposition of such strict rules and responsibilities on a carrier could impede the development of the industry.

However, the aviation approach can also present certain difficulties. For example, many space tourism suborbital vehicles have distinctive technical characteristics that are possessed by spacecraft but not by aircraft.[45] These are related to the mode of departure of these suborbital vehicles, which takes the form of a launch. Consequently, we cannot require the automatic implementation of technical requirements suited to aircraft to space tourism suborbital vehicles. In this case, ICAO could adopt new technical rules in the annex specifically designed for suborbital vehicles.[46]

Furthermore, the system of aircraft certification, which is a lengthy and expensive procedure, is less appropriate for application to space tourism suborbital vehicles.[47] This is related to the novelty and increased risk of suborbital flights, i.e. to their extremely low level of safety, which distinguishes them from air flights. One potential solution might be to adopt the provisional license delivery

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[42] Masson-Zwaan & Moro-Aguilar, *supra* note 6, at 246.

[43] Nase, *supra* note 7, at 766.

[44] Sara M. Langston, *Suborbital Flights: A Comparative Analysis of National and International Law*, 37 J. SPACE L. 307 (2011); Moro-Aguilar, *supra* note 9, at 684.

[45] Moro-Aguilar, *supra* note 9, at 684.

[46] Masson-Zwaan & Moro-Aguilar, *supra* note 6, at 248.

[47] Tanja Masson-Zwaan, Rafael Moro-Aguilar & Aron Lentsch, *The Future Regulation of Suborbital Flight in Europe*, 30 SPACE POL'Y 76 (2014); Moro-Aguilar, *supra* note 9, at 699.

system discussed above until such time as a complete certification system can be developed and implemented.[48] In the case of license issuance, the responsibility remains with the operator. By contrast, certification assigns responsibility to the certifying public authority or agency.[49] The United States has already adopted a license system of this kind, which presents a guarantee of the general safety of suborbital vehicles and protects third parties (not involved in a flight) against the dangers that can potentially occur during a suborbital flight.[50] Moreover, this system has already been recommended by other national authorities, such as those of Great Britain and Spain.[51] This tendency is a welcome one, as in the context of the EU and the United States, such a license system would favor both the development of the airspace industry and the unification of the legal regimes applicable to suborbital vehicles.[52]

Another negative consequence of the aviation approach is the risk it poses to the space community of losing opportunities to commercialize specific space tourism concepts. Specifically, a vision of space tourism suborbital vehicles as air flights could make them less attractive to consumers who are more interested in participating in the unique experience of space flight. Furthermore, any attempt to implement this approach in practice might be met with resistance on the part of space actors due to their fear of losing the influence they have over COPUOS,[53] given that they do not have the same influence over ICAO.

In general, the application of this approach constitutes an obstacle to the development of this new branch of activities, as aviation law contains very detailed and highly strict regulations.[54] For this reason, the majority of respondents to the 2012 "FAST20XX Questionnaire on Human Suborbital Flight"—which included national and European regulators, insurers, consultants, vehicle constructors and operators, consumers, and lobbyists—stated a preference for a step-by-step approach, which would allow for the

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[48] Moro-Aguilar, *supra* note 9, at 700.

[49] Masson-Zwaan & Moro-Aguilar, *supra* note 6, at 251.

[50] Moro-Aguilar, *supra* note 9, at 700-701.

[51] *Id*. at 703, 707.

[52] Masson-Zwaan & Moro-Aguilar, *supra* note 6, at 252.

[53] Thomas Cheney & Lauren Napier, *Policy Analysis: Air Versus Space, Where Do Suborbital Flights Fit into International Regulation?* 7 J. SCI. POL'Y & GOVERNANCE 9 (2015).

[54] Moro-Aguilar, *supra* note 9, at 684.

progressive adoption of rules governing suborbital flights in line with the growth of knowledge and technical progress in this domain. At the same time, for reasons of legal security, most respondents advocated that all important regulations should be in place from the beginning of their exploitation.[55] Moreover, EASA added in its response that technical and operational questions could be left to regulation by soft law depending on the different types of suborbital vehicles. In practice, to date, national legal regimes have effectively followed the step-by-step approach, providing the same system of license delivery established in the United States.[56] US law initially envisages the regulations as being initially restricted to the provisions, which ensure the safety of a flight and third parties by leaving room for the industry to develop.[57]

In summary, we conclude that the application of aviation law to suborbital flights may well present certain difficulties in the absence of serious adjustments. However, it is possible to apply aviation law in its essence, and with some modifications, while also considering the particularities of space tourism suborbital flights. In this case, we can instead focus on the regime of sui generis, or more precisely, on an aviation sui generis approach. At the same time, in comparison with the sui generis approach in the strict sense, an advantage of this particular approach is the simplicity with which the legal regime can be imposed, since the application of the aviation approach does not require the adoption of a large number of new rules.

2. Earth-to-Earth Connection Flights

The aviation approach is recommended by ICAO[58] for flights that conduct Earth-to-Earth connections while crossing into outer space. The Legal Committee of ICAO suggests classifying these

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[55] Masson-Zwaan, Moro-Aguilar & Lentsch, *supra* note 46, at 79; Moro-Aguilar, *supra* note 9, at 698.

[56] Moro-Aguilar, *supra* note 9, at 698, 701.

[57] Masson-Zwaan & Moro-Aguilar, *supra* note 6, at 249.

[58] Langston, *supra* note 43, at 313; Nase, *supra* note 2, at 764; INTERNATIONAL CIVIL AVIATION ORGANIZATION, COMMERCIAL SPACE FLIGHTS (2015), LC/36-WP/3-2, at 5, https://www2023.icao.int/Meetings/LC36/Working%20Papers/LC%2036%20-%20WP%203-2.en.pdf [hereinafter ICAO Note]; JAKHU ET AL., *supra* note 18, at 253; NICOLAS MATEESCO MATTE, DEUX FRONTIÈRES INVISIBLES: DE LA MER TERRITORIALE À L'AIR TERRITORIAL 225 (1965); CHARLES M. CHAUMONT, LE DROIT DE L'ESPACE. QUE SAIS-JE?: LE POINT DES CONNAISSANCES ACTUELLES 98 (1960).

flights as air flights, as such vehicles have all the constitutive elements of aircraft. Moreover, according to the Legal Committee, "airspace would be the main cent[er] of activities of suborbital vehicles in the course of an [E]arth-to-[E]arth transportation, any crossing of outer space being brief and only incidental to the flight."[59] ICAO has already admitted itself to be an authority that is in charge of regulating suborbital flights.

The aviation approach is also recommended by many other commentators.[60] For instance, Nase justifies the choice of this approach with reference to the simplicity and clarity of the reglementary authority and the rules applicable to suborbital flights, which are, in his opinion, the most appropriate for the regulation of such flights. Moreover, aviation law contains rules governing a carrier's liability towards passengers, which will be indispensable in practice for those flights intending to carry passengers from one city (or one State) to another.[61]

In the context of this category of suborbital flights, the application of aviation law can be rooted in the following approaches which apply to the demarcation between aviation law and space law: the functionalist approaches based on the aim of the flight or the maximum capability, or the approach based on the flight's velocity. A suborbital vehicle is considered to be an aircraft independently of whether it crosses into outer space.

In regard to the legal status of suborbital vehicles that are intended to be involved in transportation in aviation law, in contrast to space tourism suborbital vehicles, might be categorized as scheduled air services. As a result, they would be subject to the legal regime provided by Article 6 of the Chicago Convention. In other words, they may not fly over or into the territory of another State, except with the special authorization of that State.[62] In the context of this approach, it is essential to distinguish suborbital flights from domestic and international flights, since international aviation law does not apply to the former. As a result, the applicable legal regime may vary depending on this criterion.

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[59] ICAO Note, *supra* note 57, at 5.

[60] Langston, *supra* note 43, at 313; Nase, *supra* note 7, at 766; ICAO Note, *supra* note 57, at 5; JOSEPH N. PELTON & RAM S. JAKHU, SPACE SAFETY REGULATIONS AND STANDARDS 253 (2010); MATTE, *supra* note 57, at 225; Chaumont, *supra* note 57, at 98.

[61] Nase, *supra* note 7, at 764.

[62] Chicago Convention, *supra* note 10, at art. 6.

In general, it is clear that Earth-to-Earth connection suborbital flights bear far more resemblance to air flights than space tourism suborbital flights, since they have the same objective (i.e. transportation). At the same time, it is likely that this category of suborbital vehicles has its own technical characteristics, which would be different from those of aircraft and more reminiscent of those of space objects. In other words, such vehicles might incorporate a rocket engine mechanism and take off via vertical launch. Consequently, the technical rules applicable to such vehicles could be different from similar rules provided under aviation law. However, this could be a single exception from the general application of aviation law to suborbital flights. Consequently, in general, the aviation approach is deemed suitable in terms of both the choice of applicable law and the competent authority in the domain of point-to-point suborbital flights.

B. Space Approach

Under the space approach, we apply space law to suborbital flights. This approach was proposed by the Legal Committee of ICAO[63] and is suggested by certain commentators.[64]

This approach complies with many provisions of existing space law. In brief, the Outer Space Treaty deals with the use of outer space.[65] In other words, application of the Treaty does not require a space object to orbit around the Earth; crossing into outer space is enough. Another example is the Liability Convention, which applies to vehicles that do not "touch" outer space, as the act of launching the space object is sufficient for applicability purposes.[66] However, Article II of the Registration Convention, which refers to a space object that "is launched into [E]arth orbit or beyond," cannot apply

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[63] ICAO Note, *supra* note 57, at 6.

[64] Frans von der Dunk, *The Integrated Approach—Regulating Private Human Spaceflight as Space Activity, Aircraft Operation, and High-Risk Adventure Tourism*, 92 ACTA ASTRONAUTICA 208 (2013); Tanja Masson-Zwaan & Steven Freeland, *supra* note 27, at 1603; Langston, *supra* note 43, at 323; MICHEL DE JUGLART ET AL., TRAITÉ DE DROIT AÉRIEN VOLUME 1 3 (2nd ed. 1989).

[65] *See* Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty].

[66] *See* Convention on the International Liability for Damage Caused by Space Objects, Mar. 29, 1972, 24 U.S.T. 2389, 961 U.N.T.S. 187 [hereinafter Liability Convention].

to suborbital flights.[67] Consequently, the absence of the registration provided for suborbital vehicles is a lacuna in space law.

Regarding space tourism suborbital flights, the space approach arises from the functionalist approach based on the maximum capability. This functionalist approach allows the choice of law applicable to suborbital flights; i.e., a suborbital vehicle is considered a space object under the condition that its objective is to penetrate outer space, regardless of the duration of the flight in airspace.[68] For space tourism suborbital flights, it is recommended to classify these as space objects, and more precisely, as rockets.

The space approach is an approach that has historically been already applied to space tourism suborbital flights. In 1961, two suborbital flights were launched in the United States in the context of the *Mercury* program. In addition to the suborbital nature of such flights, the pilots who were on board these vehicles have been, to date, officially considered as astronauts.[69] We may assume that the suborbital industry today also sees space tourism suborbital vehicles as space flights, given the fact that it has referred to them as "space tourism."[70]

Simultaneously, none of the European States have until recently chosen space law for the regulation of suborbital flights. Furthermore, there are few national laws in Europe that pertain to national space law.[71] In contrast to European countries, however, US space law has a specific impact on the regulations of suborbital flights, even though the United States has not opted for the space approach. At the European level, ESA sees its secondary role in the regulation of suborbital flights, giving priority to EASA.[72] At the international level, no decision with respect to suborbital flights has been made by COPUOS to date.[73]

The above may be related to the fact that the space approach has certain disadvantages in regard to space tourism suborbital flights. As previously discussed, space law does not contain any

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[67] Masson-Zwaan & Moro-Aguilar, *supra* note 6, at 245-246.

[68] Cheney & Napier, *supra* note 53, at 9.

[69] Masson-Zwaan & Moro-Aguilar, *supra* note 6, at 245.

[70] SAMEH, *supra* note 8, at 35.

[71] Masson-Zwaan & Moro-Aguilar, *supra* note 6, at 250; von der Dunk, *supra* note 63, at 201.

[72] Masson-Zwaan & Moro-Aguilar, *supra* note 6, at 250; ESA, Space Bulletin, *supra* note 25, at 22-23.

[73] Masson-Zwaan & Moro-Aguilar, *supra* note 6, at 248.

provisions of private law. It protects neither passengers nor space tourists against any damage that could eventually be caused by a space object, since almost all provisions of space law are based on the assumption that space activity is State activity.[74] Moreover, pursuant to Article VII of the Liability Convention, State liability to passengers or tourists is not envisaged, since foreign participants and the citizens of the responsible State are excluded from the scope of this Convention.[75] In this case, one possible solution to regulating liability for space tourists would be to consider flights of this kind as trips taken by tourists at their own risk (as in the current US legal model).[76] Under this approach, tourists are informed of the risks related to the suborbital flight and the absence of certification guaranteeing its safety. After that, tourists should provide their written consent to participate in this flight.[77] They also waive all rights to any subsequent claims against the liability of an operator for potential damage that could be caused during a suborbital flight (or the tourist and operator can also agree on their regime of liability).[78] This approach, also called "informed consent," was maintained by the majority of the respondents to the FAST20XX Questionnaire on Human Suborbital Flight, including EASA. One of the persons interviewed added the remark that it was necessary to presume the awareness and acceptance of the risk by space tourists; it is very likely that this opinion is shared by most of the respondents.[79] In addition to the United States, the "informed consent" approach has also been adopted by other national authorities of

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[74] This is the reason why the European Commission Enterprise and the Industry Directorate-General have criticized the application of the space approach. In their opinion, such a definition of suborbital vehicles would result in a low perception of safety issues and varying levels of safety. Booz & Company & SpaceTec Partners. Ref. Request for Services under Framework Service Contract No. Entr/2009/050— Lot 1 (Contract No. 30-Ce-036363/00-01) Evaluation of The European Market Potential for Commercial Space Flight, Ref. Ares (2013)617034 - 09/04/2013 Prepared for the European Commission Enterprise and Industry Directorate-General. 2013 [interactive]. <http://ec.europa.eu/enterprise/policies/space/files/policy/commercial-suborbital-flights-final-report_en.pdf> (citing Paulina E. Sikorska, *The Mission (Im)Possible: Towards a Comprehensive Legal Framework Regulating Safety Issues of Point to Point Suborbital Flights*, 21 JURISPRUDENCE 1063 (2014)).

[75] Masson-Zwaan & Moro-Aguilar, *supra* note 6, at 246.

[76] Nase, *supra* note 7, at 765.

[77] Masson-Zwaan & Moro-Aguilar, *supra* note 6, at 249.

[78] Frans G. von der Dunk, *Space Tourism, Private Spaceflight and the Law: Key Aspects*, 27 SPACE POL'Y 146, 152 (2011).

[79] Moro-Aguilar, *supra* note 9, at 698-699.

different States.[80] In reality, however, the adoption of the informed consent approach implies a renunciation of the regulation of a carrier's liability to space tourists, or in other words, as noted by one respondent to the questionnaire, deregulation.[81] It would be preferable to assign a certain degree of the liability to the carrier; notably, this would be limited to accidents or damages arising from human actions, and not due to technical reasons (i.e., damage that occurred due to the fault of the operator).[82]

Moreover, space law does not provide a right to cross airspace under the jurisdiction of any State other than the launching State. However, this right is indispensable in the case of international suborbital flights conducting Earth-to-Earth connections, as well as in the context of space tourism suborbital flights if a vehicle crosses multiple airspaces. The Legal Committee of ICAO proposed granting space objects the right to cross the airspace of another State in a non-offensive manner during launch or landing. This right, called the "right of innocent passage," has already been admitted in maritime law.[83] In the opinion of this Committee, this case could be governed by bilateral agreements.[84] In addition to the difficulties outlined above, this approach will also be problematic if States disapprove of restricting their sovereignty with regard to outer space.[85]

Another gap in space law is the absence of rules on security analogous to those established under aviation law, which will be necessary in future in the event that passengers or space tourists are present on board a craft.[86] Furthermore, under space law, the issuance of licenses to the personnel of space objects or the certification of these objects (similar to aviation law) is not provided.[87]

In summary, these gaps may be explained by the fact that the rules outlined by space law are sufficient only for governing legal relations pertaining to space flights with professionals on board. Consequently, there are no legal regulations under space law

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[80] For example, by the authorities of Great Britain and Spain (see *id*. at 704, 707).

[81] Moro-Aguilar, *supra* note 9, at 699.

[82] Julie Abou Yehia & Kai-Uwe Schrogl, *European Regulation for Private Human Spaceflight in the Context of Space Traffic Management*, 66 ACTA ASTRONAUTICA 1618, 1621 (2010).

[83] Langston, *supra* note 43, at 317.

[84] ICAO Note, *supra* note 57, at 5.

[85] Cheney & Napier, *supra* note 52, at 9.

[86] von der Dunk, The Integrated Approach, *supra* note 63, at 208.

[87] Yehia & Schrogl, *supra* note 81, at 1620.

governing relations with consumers. Furthermore, space law does not reflect space activities as concurrent commercial activities. From this perspective, space law is insufficiently developed to regulate suborbital flights, which necessitates the adoption of a set of new rules. Consequently, both UNOOSA and COPUOS, as well as States, will need to draft new provisions for such that will not have been verified in practice.

The above comments are also valid for suborbital vehicles that are intended to be involved in transportation. This definition of applicable law also does not appear to be appropriate for this category of suborbital flights, as this category has far more in common with air flights than with space flights. Consequently, UNOOSA, COPUOS, and States would need to develop many new provisions to govern such flights, even though the majority of these already exist in aviation law and are also suitable for this purpose.

At the same time, we contend that space law should be a suitable form of law to apply to suborbital vehicles intended to be launched for scientific purposes, given their similarity with spacecraft. We believe that it is for this reason that, in the United States, there is no mention of sounding rockets and space probes in chapter III title 14 of the Code of Federal Rules, which deals with commercial space transportations under the authority of the FAA; it is likely also for this reason that these vehicles are mentioned in chapter V on NASA.[88]

In the US, the same approach was chosen not only for sounding rockets, but also for suborbital vehicles carrying astronauts (flights flying with astronauts aboard belong to the category of scientific suborbital vehicles, since they are in pursuit of scientific goals and do not carry any commercial passengers). In more detail, this approach is planned to be selected for this type of suborbital flight, while NASA's astronauts may use commercial vehicles operated by private companies for the crew training of astronauts.[89]

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[88] For instance, sounding rockets are explicitly mentioned in the list of NASA's responsibilities in the Goddard Space Flight Center in Greenbelt. 15 C.F.R. 1201.200. Under 15 C.F.R. 1201.200, the Office of Space Science and Applications of NASA utilizes sounding rockets to conduct its programs. Space probes are included in the program of the Ames Research Center in Moffett Field. *Id*.

[89] This announcement was made by NASA Administrator Jim Bridenstine in March 2020. *See* Jeff Foust, *NASA Exploring Ways to Fly Astronauts on Commercial Suborbital Vehicles*, SPACENEWS (Mar. 3, 2020), https://spacenews.com/nasa-exploring-ways-to-fly-astronauts-on-commercial-suborbital-vehicles/.

Thus, NASA Administrator Bridenstine announced his intention not to extend liability waiver requirements (which currently cover crew and SFPs aboard a suborbital vehicle) to astronauts. For this purpose, NASA would certify these suborbital vehicles as safe.[90] With regard to requirements for astronauts, the plan is to base these on the commercial crew requirements.

We agree that suborbital vehicles carrying space tourists cannot be precisely regulated in the same manner as suborbital vehicles flying with astronauts aboard due to the differences in the status and characteristics of astronauts and space tourists (we can draw an analogy here with the legal regime governing pilots in military aviation, whose legal status is inferior to that of pilots in civil aviation).[91] However, the technical requirements for suborbital vehicles should be the same, regardless of the status of the humans onboard.

We further agree that space law should be applied to suborbital vehicles carrying astronauts. However, such suborbital flights should not be considered space flights, since they are planned to be subject to different (albeit still space law-based) regulations. In theory, in addition to flights aboard private suborbital vehicles, astronauts may also fly aboard State suborbital vehicles. In these cases, the vehicles would be flying for scientific purposes with professionals aboard and would therefore be considered public flights. Such flights also fall under the category of scientific suborbital vehicles; consequently, space law should also apply to them without any changes.[92]

C. Integrated Approach

As noted above, neither aviation law nor space law alone can be used to regulate space tourism suborbital flights in an appropriate and adequate way. This may be explained by the fact that flights in this category possess the characteristics of space and air flights simultaneously. Consequently, one of the proposed approaches entails a joint application of aviation and space law, i.e. an integrated approach.

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[90] *Id.*

[91] We can draw a comparison to the relationship between the legal regime of civil aviation and that of military aviation, the latter of which is inferior to aviation law.

[92] *See infra* sub-chapter 5.2.2 for further details.

Under the integrated approach, a regime that is applicable to suborbital flights should integrate the application of space and aviation law simultaneously,[93] or the application of space law to the phase of launch and flight in outer space and the application of aviation law to the phase of flight and landing (while the vehicle is travelling using the mechanism of aircraft flight). Additionally, the integrated approach may be applicable in the case where a suborbital flight involves the operation of two vehicles. In this case, the first vehicle is incapable of reaching outer space and serves as the launch platform for the first stage of a flight, while the second is both capable of and dedicated to reaching and operating in outer space. As a result, the first vehicle can be treated as a conventional aircraft, while the second can be considered a space object. These vehicles will therefore be subject to air and space law respectively. At the same time, the identification of the whole flight and, consequently, its inclusion in the scope of the law, is defined according to the final destination of the space component of the flight.[94]

This approach can be justified by three different approaches: the functionalist approach based on the type of vehicle (regarding complex vehicles, which have the characteristics of an aircraft and a space object at the same time), the spatialist approach (in the context of the particular interpretation of this approach), or the complex approach.

This approach has been promoted by Marcoff, who considers suborbital vehicles to be aircraft. Thus, he proposes that the legal regime of aviation—i.e., the legal regime of the sovereignty of space—be applied to a suborbital vehicle when it flies in airspace, while the legal regime of space law should be applied once the vehicle passes the frontiers of airspace. At the same time, he favors space law for the regulation of legal issues such as liability for damage caused by a suborbital vehicle. Furthermore, Marcoff sees space law as applicable to the definition of the crew's legal status. In other words, in his opinion, crew members should be referred to as astronauts. Marcoff also favors the integrated approach for suborbital vehicles launched for military purposes. However, in contrast to other categories of such vehicles, they cannot benefit from the space

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[93] Masson-Zwaan & Moro-Aguilar, *supra* note 6, at 250.

[94] *Id.*

law regime of liberty during their entire flight.[95] This model of suborbital flight—and, as such, its regulations—was also provided by the Spanish Draft Bill on suborbital flights.[96]

This approach is reminiscent of the proposition outlined in the above-mentioned notes of the EASA officials regarding the application of aviation law to the part of a flight performed in airspace, while space law is applied to the remaining part of a flight in outer space, which would be governed by States.[97] As a result, during the portion of its flight that takes place in outer space, a vehicle would be under the jurisdiction of the State of registration. At the same time, the EASA officials proposed a single mechanism of registration by air authorities.[98] This is an approach chosen by the United States for its suborbital vehicles. It applies different legal regimes to suborbital flights depending on the type of vehicle in question. For example, if a vehicle has the characteristics of both a space object and an aircraft, the vehicle should receive a license as a space object and certification as an aircraft.[99]

In regard to authorities being in charge of suborbital flight regulation, in practice, we can also imagine a combination of one approach to the law applicable to suborbital flights with another approach applicable to the authority that should be responsible for their regulation. For instance, Yehia and Schrogl suggest the integrated approach to the applicable legal regime. At the same time, they consider it preferable to give EASA and ICAO a major role in the regulation of these flights.[100] This means that, at the international and national levels, it is foreseeable to adopt a distinctive regime for suborbital flights overseen by already existing authorities that are competent either in the domain of space law or aviation law, or (ideally) a combination of the two.

One advantage of this approach relates to the possibility of applying technical rules to the safety of a flight that pertain to aircraft and space objects at the same time. This approach also ensures that there are no gaps in the domain of flight security.

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[95] MARCO G. MARCOFF, TRAITÉ DE DROIT INTERNATIONAL PUBLIC DE L'ESPACE 419-421 (1973).

[96] Masson-Zwaan & Moro-Aguilar, *supra* note 6, at 708.

[97] Moro-Aguilar, *supra* note 9, at 694.

[98] Masson-Zwaan & Freeland, *supra* note 27, at 1602.

[99] Masson-Zwaan & Moro-Aguilar, *supra* note 6, at 249.

[100] Yehia & Schrogl, *supra* note 81, at 1619, 1622.

However, this approach also presents some disadvantages. The joint application of aviation and space law does not always appear to be possible, given that the two regimes are incompatible in many cases.

This approach also creates difficulties regarding the dual registration of space objects and aircraft, which can cause complementary problems for the development of the airspace industry. However, according to Hobe, it is entirely foreseeable and preferable to establish double registration, at least for some specific models such as the SpaceShipOne model.[101]

This approach additionally engenders problems in the application of frameworks of liability, given that the two regimes of aviation law and space law are incompatible. Cheney and Napier suggest applying the regime of liability provided by aviation law.[102] This is because, if this is not done, States would be opposed to admitting their entire liability, even if the best solution would be the harmonization of the two legal regimes.[103]

Regardless, we should distinguish between the application of the rules on liability and those pertaining to a flight itself. The application of aviation law to a suborbital vehicle during flights in airspace does not automatically preclude the application of space law in the sphere of liability in cases where damage arises from the flight in airspace.[104]

Furthermore, there is a collision between the legal provisions of space law and those of aviation law regarding liberty of access to airspace. As noted above, in aviation law, the principle of sovereignty applies (even if the objective of a flight is to penetrate outer space). Space law, conversely, provides the principle of liberty of access to outer space.[105] However, if we imagine aviation law being applied to the part of a suborbital flight involving travel through airspace, while space law is applied to the part of the flight performed in outer space, this conflict can be resolved. This should also not be problematic for space tourism suborbital flights, as these are typically performed within a single state.

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[101] Stephan Hobe, *The Legal Regime for Private Space Tourism Activities—An Overview*, 66 ACTA ASTRONAUTICA 1593, 1595 (2010).

[102] Cheney & Napier, *supra* note 53, at 8.

[103] *Id*.

[104] Nase, *supra* note 7, at 763.

[105] Cheney & Napier, *supra* note 53, at 7.

Another disadvantage of this approach concerns the absence of any system of joint control of air and space traffic. Thus, the same vehicles would be controlled twice by the two different navigation services. One potential solution would be the establishment of a uniform service of control of vehicles, i.e., the creation of a uniform traffic airspace.[106]

The key disadvantage of this approach is the complexity and the duration of the adoption of the joint regime. Furthermore, this approach also leaves both parties (the international aviation and space organizations) dissatisfied, since each loses its exclusive control over the regulation of air and space traffic respectively.[107] Furthermore, in the FAST20XX Questionnaire on Human Suborbital Flight mentioned above, the majority of respondents were positive about the idea of a uniform legal regime applicable to suborbital flights, regardless of their phase of flight or suborbital vehicle type.[108]

In general, the adoption of this approach first requires the resolution of numerous conflicts between aviation law and space law. Indeed, the simultaneous application of aviation law and space law to suborbital flights will sometimes be impossible due to the presence of irreconcilable rules in aviation law and space law, such as the legal regimes of space and liability. The sole instance in which the joint—or rather consecutive—application of aviation and space law is suitable is the application of the legal regimes of aviation law and space law to airspace and outer space respectively. It is therefore desirable to apply a new regime specifically to suborbital flights that is developed on the basis of both aviation and space law. In this case, it may be preferable to discuss the legal regime of *sui generis*, applicable to suborbital flights and inspired by the rules of aviation law and space law. This could be considered a new branch of law, which might be referred to as airspace (or aerospace) law.

D. Sui Generis Approach

As explained above, the integrated approach does not allow for the development of a legal regime capable of properly and completely regulating space tourism suborbital flights. In addition to

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[106] *Id.* at 8.
[107] *Id.* at 10.
[108] Moro-Aguilar, *supra* note 9, at 697.

the fact that the two legal regimes of aviation law and space law are incompatible, this category of flights has certain characteristics that are not present in both space and air flights (such as the touristic objective and the increased level of risk, respectively).[109] Consequently, in addition to the application of rules from space law or aviation law, the regulation of this category of flights also requires the adoption of certain rules unique to this category that would differ from the rules of both space law and aviation law. This vision of the legal regime applicable to suborbital flights constitutes a *sui generis* approach. This approach stems from the functionalist approach based on the type of activity or the aim of flight (in the case of a particular interpretation of this approach, excluding suborbital flights from the scope of space law) or from the complex approach. It was proposed by Savic and Petic.[110]

Under the *sui generis* approach, a new specific legal regime, different from the regimes adopted in aviation law or space law, should apply to suborbital flights. We can highlight various sub-approaches in the context of the *sui generis* approach, such as the space *sui generis* approach, the aviation *sui generis* approach, and the *sui generis stricto sensu* approach. All of these sub-approaches hold that a new regulation regime for suborbital flights should be adopted. Thus, we can conceptualize the *sui generis* approach in the strict sense, under which neither aviation law nor space law is suitable to regulate suborbital flights, meaning that a completely new and different regime should therefore be developed for suborbital flights. However, we doubt that this solution would be entirely practicable or reasonable, since the existing rules from space and aviation law are wholly suitable for regulating suborbital flights in many cases (due to the characteristics they have in common with air and space flights). In other words, this new branch would instead reproduce some rules contained in space and aviation law, i.e., the space and aviation *sui generis* approaches will be applied respectively. However, under the space and aviation *sui generis* approaches, the new legal framework adopted for suborbital vehicles would also constitute space and aviation law respectively. For instance, we may imagine an aviation *sui generis* approach under which suborbital vehicles are broadly considered aircraft that are

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[109] von der Dunk, *supra* note 63, at 206.

[110] Iva Savic & Nika Petic, *Commercial Suborbital Flights—Air or Space Law?*, 9 ZAGREB L. REV. 230, 249 (2020).

subject to aviation law, but specific regulation by aviation law for suborbital flights is provided. The *sui generis stricto sensu* approach, for its part, provides an entirely new independent legal regime for suborbital flights. At the same time, we may also consider the space and aviation *sui generis* approaches to be sub-approaches of the space and aviation approaches respectively, rather than as sub-approaches of the *sui generis* approach. In this case, for example, the space approach encompasses the *stricto sensu* sub-approach (the rules of space law that apply to space objects also apply to suborbital vehicles) and the *sui generis* sub-approach (suborbital vehicles are subject to an independent space legal regime that differs from the space legal framework for space objects). The interpretation applied would depend on the specific interpretation of the classification of the given approaches.

The application of the *sui generis* approach has certain practical implications. For instance, a distinct register could be created for the registration of suborbital vehicles.

This could also mean that new legal acts should be adopted at the national level. In practice, the *sui generis* legal regime has been adopted by the US for space tourism suborbital flights: the United States has already established its own regime applicable to suborbital flights by adopting the Commercial Space Launch Amendments Act[111] and later the Human Space Flight Requirements for Crew and Space Flight Participants Act.[112] The Netherlands has also adopted a single distinct act devoted to suborbital flights, following the US model.[113] However, even though distinct legislation dealing with suborbital flights was adopted in these countries, the regulations therein contain many rules that are also applicable to aircraft or space objects. As was noted above, in practice, it is not pragmatic to create entirely new regulations for suborbital flights that differ significantly from the existing regulations of aviation and space law.

At the international level, another possible consequence of applying the *sui generis* approach would be the establishment of a new

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[111] Moro-Aguilar, *supra* note 9, at 679 (referencing Commercial Space Launch Amendments Act, Pub. L. No. 108-492, 118 Stat. 3974 (2004)).

[112] von der Dunk, *supra* note 63, at 201 (referencing Human Space Flight Requirements for Crew and Space Flight Participants, 71 Fed. Reg. 75616 (Dec. 15, 2006)).

[113] Moro-Aguilar, *supra* note 9, at 710.

convention specifically intended to regulate suborbital flights.[114] However, the realization of this approach presents additional difficulties in comparison to other approaches, since it would require the adoption of a totally new system of legal rules. One possible alternative solution would be the adoption of non-binding acts (soft law)—such as, for example, codes of conduct—by international organizations.[115] Despite the above-mentioned disadvantage of this approach, its significant advantage would be the adoption of an independent legal regime for suborbital vehicles. The development of an independent legal regime applicable to space tourism suborbital flights is the optimal solution, as it allows all elements and particularities of such flights to be taken into consideration.

With regard to point-to-point suborbital flights, it is remarkable that, in the FAST20XX Questionnaire, the majority of respondents preferred the *sui generis* approach to be applied to these flights, or more precisely, the application of a new and specific legal regime to these flights (in the absence of such a regime, however, the application of aviation law would be favored).[116] Respondents stated that the specific legal regime applicable to these flights should contain rules derived from both aviation and space law, but should be based primarily on aviation law, as such flights have more points in common with air flights. This solution is slightly reminiscent of the integrated approach. We share the same vision in regard to this category of suborbital flights for the reason exposed above.

With regard to the competent authorities in charge of adopting the *sui generis* regime for suborbital flights, in theory, new authorities should be established for this purpose. At the level of international law, this could lead to the establishment of a new international organization that is individually responsible for the regulation of suborbital flights, or alternatively an agency within the United Nations.[117] Another possibility would involve establishing a commission of completely independent experts. If we were to apply the *sui generis* approach at the national level, we should envisage the establishment of a new authority (which may be difficult in practice) in charge of suborbital flights.

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[114] Hobe, *supra* note 100, at 1593.
[115] Masson-Zwaan & Moro-Aguilar, *supra* note 6, at 247.
[116] Masson-Zwaan et al, *supra* note 46, at 78.
[117] Cheney & Napier, *supra* note 53, at 11.

In practice, we can also imagine a combination of one approach to the law applicable to suborbital flights with another approach applicable to the authority that should be responsible for their regulation. This is the course adopted by the United States, whose *sui generis* regime for suborbital flights was adopted by the FAA (or more precisely, the Associate Administrator for Commercial Space Transportation of the FAA),[118] which is in charge of aviation, commercial space activities, and suborbital flights.[119] Simultaneously, the legal regime selected in this case is closer to the space approach, as these suborbital vehicles were classified as rockets. This special legal regime for suborbital flights can be differentiated from the general space legal regime primarily by its private character and the presence of commercial passengers aboard. In other words, special regulations are provided for the category of flights called "commercial human spaceflights," which encompasses not only suborbital flights but also potentially orbital flights. Under US law, suborbital flights constitute a specific category of space flights and are subject to space law, although the specific "chapter" applied differs from that applied to other space flight. In context, we may refer to the approach selected by the US as a space *sui generis* approach, since the US has adopted specific regulations for suborbital flight, albeit in the context of space law.

On this basis, we believe that *sui generis* approach (not *stricto sensu*) should be adopted to regulate space tourism suborbital flights, since this category of flights has its own unique and specific characteristics that are not present in space or air flights. Consequently, in addition to applying rules originating from space law or aviation law, regulating this category of flights will also necessitate the adoption of new and specific rules.

E. Maritime Law and Suborbital Flights

It is clear that a suborbital vehicle cannot be termed a maritime vessel and be subject to regulation by maritime law. However, there are authors who believe that solutions to some problems and issues that arise in the context of the legal regime of suborbital flights may be found in maritime law. In their opinion, space travel flights have more features and problems in common with maritime

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[118] *Id.* at 76.

[119] Moro-Aguilar, *supra* note 9, at 696.

transportation than with aviation. As a result, there are proposals that some related issues be regulated as set out in maritime law. This method constitutes a complementary method that allows for the adoption of appropriate provisions for certain scopes of suborbital flight regulations in the context of the *sui generis* approach.

Furthermore, one scholar, Melanie Walker, compares the cruise industry to space tourism.[120] In contrast with aviation, the primary purpose of both is entertainment rather than merely transportation. In other words, these industries offer their customers the experience of enjoying remarkable and beautiful views during a trip.[121]

Walker also identifies some similarities between cruise ship travel and space travel flights in the context of the approach to passenger protection. One example concerns the approach taken in the US. Some commentators consider US maritime law to be more focused on cruise line protection than on passenger safety. Once a cruise ship is outside of territory that falls under State jurisdiction, the US government does not have many powers to protect passengers on board a ship. We can see the same tendency in the context of suborbital flights. In the US, the public involved is afforded much more State protection than space flight participants.[122] We can conclude that, regarding this matter, both maritime and suborbital regulations require updates in the domain of passenger protection regulations.

Moreover, maritime transportation and suborbital flights face similar challenges related to the debris that may be encountered during a flight. Most orbital debris is located in low Earth orbit, which is the final goal of space tourist flights. This is the significant, as yet unsolved, concern for outer space activity that is becoming increasingly more serious as time passes. If nothing changes, the probability of a collision between pieces of space debris, and between suborbital vehicles and space debris, will increase. Regarding maritime transportation, pollution of the sea is a problem to which maritime law regulators have been searching for a solution

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[120] *See* Melanie Walker, *Suborbital Space Tourism Flights: An Overview of Some Regulatory Issues at the Interface of Air and Space Law*, 33 J. SPACE L. 375 (2007).

[121] *Id*. at 388-389.

[122] *Id*. at 390.

for years. Consequently, for both maritime and space law, debris is an important issue that needs resolving.[123]

Moreover, we can identify many similarities between international maritime law and international space law—or, more precisely, the laws have a number of similar principles.[124] For instance, in international space law, as mentioned above, under the Outer Space Treaty, outer space "is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means."[125] Regarding international maritime law, Article 137 of the 1982 Law of the Sea Convention states:

> No State shall claim or exercise sovereignty or sovereign rights over any part of the Area[126] or its resources, nor shall any State or natural or juridical person appropriate any part thereof. No such claim or exercise of sovereignty or sovereign rights nor such appropriation shall be recognized.[127]

Another similarity between space law and maritime law relates to boundary issues. Both branches of law address issues related to the boundaries between territory under State sovereignty and territory considered "international space," which is free from any claim of State sovereignty. However, while maritime law defines a precise boundary in this instance (twelve nautical miles off their coast), the boundary between outer space and air space, as we already know, remains unspecified. Walker believes that the solution proposed by maritime law may serve as "a very useful analogue in setting precedents."[128] However, in the case of maritime law, we cannot apply the functionalist approach to define State territorial jurisdiction. This is due to the absence of difference in technical

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[123] *Id*. at 389.

[124] *Id*. at 388.

[125] Outer Space Treaty, *supra* note 64, art. 2.

[126] The ocean surface and the water column beyond the Exclusive Economic Zones constitute the high seas in the Law of the Sea Convention. Seabed beyond a coastal State's EEZs and Continental Shelf claims is defined as the Area in the said Convention. *See Chapter 2: Maritime Zones: Law of the Sea: A Policy Primer*, TUFTS UNIV., https://sites.tufts.edu/lawofthesea/chapter-two/.

[127] U.N. Convention on the Law of the Sea, Dec. 10, 1982, 1833 U.N.T.S. 397, art. 137.

[128] Walker, *supra* note 119, at 389-390.

characteristics between a vessel floating in the waters of a territorial sea and one floating in the waters over State sovereignty.[129]

Maritime law has already been a source of inspiration for aviation law. For instance, the right of an aircraft not engaged in scheduled international air services to cross the territory of another State without obtaining prior permission[130] was inspired by a maritime law rule on the right of innocent passage of a foreign maritime vessel through a territorial sea.[131]

In addition to being a source of inspiration for the regulation of suborbital flights, maritime law may be directly applicable to such flights in some specific cases. This is already the case in the context of civil aviation. For example, if an aviation accident occurs over the ocean, it may be subject to maritime law. Thus, in US law, in the event of death occurring in an accident at sea, the Death on the High Seas Act (DOHSA) would be applied even if the event in question was an aviation accident. A remedy specified under DOHSA for victims of families lost at sea is higher than such a remedy provided by aviation law.[132] Another example is the extent of State sovereignty in airspace over territorial waters,[133] which is defined by maritime law.

F. Analogy with Amphibious Vehicles

Analogy with amphibious vehicles could be another source of inspiration for establishing a legal framework for suborbital flights in the context of the *sui generis* approach. Amphibious vehicles are already used in many different countries. An amphibious vehicle is capable of moving both in water and on land. Consequently, similarly to suborbital flights, it is potentially also subject to two branches of law, specifically maritime law and transportation law.

For instance, a DUKW[134] (pronounced "duck") is an amphibious vehicle that is currently used for tourist purposes. In the US

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[129] Frans G. von der Dunk, *Beyond What? Beyond Earth Orbit?...! The Applicability of the Registration Convention to Private Commercial Manned Sub-Orbital Spaceflight*, 43 CAL. W. INT'L L.J. 269, 328 (2013).

[130] Chicago Convention, *supra* note 10, at art. 5.

[131] U.N. Convention on the Law of the Sea, *supra* note 125, art. 17.

[132] Walker, *supra* note 119, at 392.

[133] For further details, *see* U.N. Convention on the Law of the Sea, *supra* note 125, art. 2.

[134] The name "DUKW" can be explained as follows: **D**, Designed in 1942; **U**, Utility; **K**, All-wheel drive; **W**, Dual-tandem rear axles.

state of Missouri, this transport is defined as "a 'motorized amphibious vehicle' [which] is a self-propelled vehicle designed or used for transporting property or eight or more persons on the highways and waters of this state." In Missouri, an amphibious vehicle is generally considered a vessel, and not a motor vehicle.[135] Even though Missouri law obliges amphibious vehicle operators to obtain a motor vehicle license and obey highway regulations, such vehicles are also subject to maritime law; more precisely, they should comply with United States Coast Guard requirements when operating in state waters.

The National Transportation Safety Board (NTSB), the US government agency responsible for investigating civil aviation accidents as well as significant accidents in other modes of transportation in the US,[136] also confirmed that an amphibious vehicle was certified as a "small passenger vessel" and is in conformity with all federal regulations related to small passenger vessel regulation.

In this practical US example of an amphibious vehicle, we can observe a general intention of industry, as well as State authorities, to consider a vehicle of "mixed nature" as one already existing type of vehicle (we can observe the analogous approach in the US to suborbital vehicles as well). This approach can thereby be distinguished from the integrated approach, which sees a "mixed nature" vehicle as a particular type of vehicle with the features of two different types of vehicles. Nevertheless, the two branches of law are intended to regulate the vehicle in question to different extents (in contrast to the maximal capability approach). As we can see even in the Missouri case, in addition to the craft's general denomination as a vessel, it is still subject to certain rules of transportation law. With regard to suborbital flight regulations, this vision is also shared by some academic experts. In general, it is likely that we will encounter the same approach in public authorities' and industry's perception of a suborbital vehicle in the future.

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[135] Walker, *supra* note 119, at 396.

[136] *See About the NTSB*, NAT'L TRANSP. SAFETY BD., https://www.ntsb.gov/about/Pages/default.aspx; *National Transportation Safety Board (NTSB)*, USA.GOV, https://www.usa.gov/federal-agencies/national-transportation-safety-board.

G. "Wait and See" Approach

As noted above, a "wait and see" approach suggests that it is unnecessary to solve a particular problem unless and until it has appeared in practice.[137] According to this approach, the attachment of suborbital flights to a particular legal regime would also be premature, since no difficulties have yet arisen related to the absence of designation of the applicable law.[138]

However, as shown above, in the case of space tourism suborbital flights, it is impossible to postpone the solution to this problem, since the utilization of these vehicles is becoming more commonplace and will without a doubt become very widespread in the near future. Moreover, at least some of the most important issues should be subject to clear and effective regulation. For example, issues that may affect the safety of people on board, such as technical requirements and traffic management, cannot tolerate *post facto* measures.

But in regard to point-to-point suborbital flights, these flights are not yet a reality. Consequently, it is foreseeable that the applicable law will be chosen at the precise moment at which such flights become a reality in the near future. This is an approach that seems to be currently being adopted by the US for point-to-point suborbital flights. For instance, this position has already been expressed by the executive secretary of the National Space Council[139] and a White House official in 2020.

H. Military Approach

Under the military approach, suborbital vehicles are subject to military legal regulations, meaning that they should be covered by

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[137] Nase, *supra* note 7, at 754.

[138] In June 2020, Scott Pace, the executive secretary of the National Space Council, said that companies with projects involving point-to-point suborbital spaceflights should concentrate on near-term goals instead. *See* Jeff Foust, *White House Official Recommends Slow Approach to High-Speed Suborbital Transportation*, SPACENEWS (June 23, 2020), https://spacenews.com/white-house-officials-recommends-slow-approach-to-high-speed-suborbital-transportation/.

[139] Regarding these flights, Scott Pace stated:

I see us working right now on trying to get the suborbital market up, running and sort of stabilized. I think people look forward to the possibility of point-to-point passenger and cargo travel, but right now just getting routine suborbital access to space and pushing hard on the unmanned hypersonic and military applications is where the action is.

See Foust, *White House Official Recommends Slow Approach*, *supra* note 136.

the same legal regime as that provided for other categories of weapons (similarly to missiles and arms). This approach is seen as appropriate for military suborbital vehicles as this category of suborbital vehicles is considered as a category of weapons.

One of the domains covered by military legal regulations which are relevant for military suborbital vehicles is the system of arms control. To date, the international system of arms control has been based on bilateral and multilateral agreements.[140] The Strategic Arms Limitation Talks agreements (SALT I and II treaties in 1972 and 1979) established rules on the development of ground-launched intercontinental ballistic missiles (ICBMs) and submarine-launched ballistic missiles (SLBMs).[141] Subsequently, the volume of these categories of strategic missiles was limited by the Strategic Arms Reduction Treaty agreements (Start I, a 1991 agreement between the United States and the Soviet Union, Start II,[142] and New START,[143] ratified in February 2011).[144]

In 1987, an international export control regime was established to stop the delivery of missile technologies for use as weapons of mass destruction. The Hague Code of Conduct against Ballistic Missile Proliferation, adopted in 2002, prohibited the proliferation of this type of weapon.[145] This Code also provided a transparency regime for ballistic missile deployments and tests. This type of

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[140] The first bilateral agreement intending to ban an entire category of weapons, namely Intermediate-Range and Shorter-Range Missiles, was the Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Elimination of Their Intermediate-Range and Shorter-Range Missiles (Intermediate-Range Nuclear Forces Treaty, or INF Treaty), signed in 1987. Emmanuelle Maitre, *What Prospects for Arms and Missile Control after the End of the INF Treaty?*, FONDATION POUR LA RECHERCHE STRATÉGIQUE (Feb. 6, 2020), https://frstrategie.org/en/publications/recherches-et-documents/what-prospects-arms-and-missile-control-after-end-inf-treaty-2020. In 2019, the United States and Russia withdrew from this Treaty. C. Todd Lopez, *U.S. Withdraws from Intermediate-Range Nuclear Forces Treaty*, U.S. DEP'T OF WAR (Aug. 2, 2019), https://www.war.gov/News/News-Stories/article/article/1924779/us-withdraws-from-intermediate-range-nuclear-forces-treaty/.

[141] Maitre, *supra* note 139, at 1. This agreement expired on December 31, 1985. *See Strategic Arms Limitations Talks/Treaty (SALT) I and II*, OFF. OF THE HISTORIAN, https://history.state.gov/milestones/1969-1976/salt.

[142] START II never entered into force. *Id*.

[143] The New START Treaty is due to expire in February 2026, unless Russia and the United States agree to extend its terms for five years. *New START Treaty*, U.S. DEP'T OF STATE, https://www.state.gov/new-start (last updated June 1, 2023).

[144] Maitre, *supra* note 139, at 1.

[145] International Code of Conduct Against Ballistic Missile Proliferation, U.N. Doc. A/57/724 (Feb. 6, 2003).

measure had already existed at a bilateral level between the Soviet Union and the United States (starting in 1971) and was later reconstituted between India and Pakistan in 2005.[146]

Simultaneously, at present, we can identify a tendency towards the disappearance of the current system and the development of new types of missiles. For instance, the New START Treaty is due to expire in February 2026.[147] A new model of arms control might be envisaged in the future. Some analysts therefore see "arms control without a treaty" as a potential new model. This model comprises respect for the rules provided by the treaties, even though these rules may not be extended into the future. For example, States such as the US and Russia may continue implementing transparency measures, "exchanging notices on system transfers, state of alert modifications and major exercises";[148] this activity would remain under the control of the mutual inspection regime. In the opinion of one scholar, "with China, restraint measures could include recognition of mutual vulnerability to the other's nuclear arsenal, and introduce protocols for sharing information about their respective arsenals, new weapons in the pipeline, and the strategic relationship overall."[149]

As a result, this new order might be referred to as customary international law. Others have called for the study of new ways of legally controlling these weapons by means of new methods and new formats.[150]

In addition to being subject to the rules concerning establishment and transfer control, missile usage is also subject to international humanitarian law. This branch of international law regulates the conduct of armed conflict. In other words, this field of law covers the usage of weapons during international war. These regulations, similarly to those for ICBMs, are seen as appropriate for military suborbital flights.

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[146] Maitre, *supra* note 139, at 2.

[147] *New START Treaty*, U.S. DEP'T OF STATE, https://www.state.gov/new-start (last updated June 1, 2023).

[148] Maitre, *supra* note 139, at 15.

[149] *Id*.

[150] *Id*. at 2.

III. CONCLUSION

In summary, given the particular and specific features of suborbital flights, including the features and aims that differ from those of both air and space flights, we suggest that different approaches be adopted for different categories of suborbital flights. Specifically, the *sui generis* approach (not *stricto sensu*) should be adopted to regulate space tourism suborbital flights, since this category of flights has its own unique and specific characteristics that are not present in space or air flights. Consequently, in addition to applying rules originating from space law or aviation law, regulating this category of flights will also necessitate the adoption of new and specific rules. As suborbital flights that affect Earth-to-Earth connections, we favor an integrated legal regime, based primarily on aviation law, given the similarities between these flights and air flights in terms of the flight destination. However, this category of suborbital vehicles will likely have its own unique technical characteristics, which would be different from those of aircraft and more reminiscent of those of space objects. Consequently, the technical rules applicable to such vehicles could be different from such rules stipulated by aviation law. Regarding scientific suborbital flights, the space approach is seen as most suitable, given the commonalities between these flights and other space activities. Finally, with regard to military suborbital vehicles, we favor the selection of the military approach, as this category of suborbital vehicles falls under the category of weapons.