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## **Private law aspects of suborbital flights: second- and third-Party liability and insurance**

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## Private Law Aspects of Suborbital Flights: Second- and Third-Party Liability and Insurance

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**PRIVATE LAW ASPECTS OF SUBORBITAL FLIGHTS:  
SECOND- AND THIRD-PARTY LIABILITY  
AND INSURANCE**

TANJA MASSON-ZWAAN\*

ABSTRACT

Two companies carried private citizens to the edge of space in July 2021. Although suborbital flights have so far taken place within one jurisdiction—they start and end in the same state, do not pass through foreign airspace, or meet both criteria—they will become international when transportation between two points in different states via outer space becomes a reality. International law is ambiguous about the regulation of suborbital flights; neither international air law nor international space law explicitly apply. It is also unclear which organization or institution should be mandated with the international regulation of suborbital flights. The legal uncertainties must be solved to ensure a safe environment and a healthy industry. The characterization of suborbital flights as either aviation or spaceflight has important consequences, such as whether it concerns aspects of public law (e.g., safety) or private law (e.g., second- and third-party liability and insurance).

This Article focuses on the latter—the private law issues of second- and third-party liability insurance against such liability in the fields of both air and space law, illustrating the differences between the two and underlining the need for a solution.

When taking place within one jurisdiction, suborbital flights operating within a state's territory are properly subject to state regulation through national law, as this would purely be a national activity falling within a state's sovereign jurisdiction. Thus, states could decide to consider this activity as either aviation or spaceflight and apply air or space law accordingly. This may,

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however, lead to fragmentation and legal uncertainty. When flights become international by crossing borders on Earth, international agreement about what law should govern suborbital flights becomes critical and should be developed in close cooperation between the International Civil Aviation Organization (ICAO) and the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS). A new *sui generis* regime will likely borrow from both air and space law and insurance practices. Until such a regime under international law is adopted, national law will govern these issues. The only available model is U.S. law, which seems suitable for the short- to medium-term until an international regime emerges and the industry matures.

This Article will analyze current regimes and formulate recommendations for the way forward. Pursuant to that analysis, this Article concludes that a new international agreement on the operation of suborbital flights is required. For the time being, national law, harmonized to the maximum extent, should provide a solution. The Article further aims to identify relevant points for the establishment of national legislation and, in the longer term, an international agreement. Whether or not this will take the form of a legally binding instrument remains to be seen, although the latter seems more realistic in the current geopolitical context.

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## I. INTRODUCTION

**J**EFF BEZOS OF BLUE ORIGIN<sup>1</sup> and Richard Branson of Virgin Galactic<sup>2</sup> finally did it: in July 2021, within a few days of each other, they brought along several passengers on a trip to the edge of space.<sup>3</sup> Twenty-six teams took part in the Ansari X-Prize in 2004,<sup>4</sup> but only these two companies succeeded in having suborbital vehicles carry passengers to the threshold of outer space.<sup>5</sup> Interestingly, they used very different concepts of flight;

<sup>1</sup> See *About Blue Origin*, BLUE ORIGIN, <https://www.blueorigin.com/> [<https://perma.cc/6ECW-JWUW>].

<sup>2</sup> See generally *Welcome to Virgin Galactic*, VIRGIN GALACTIC, <https://www.virgingalactic.com/> [<https://perma.cc/6P3F-MF5W>].

<sup>3</sup> Caitlin O’Kane, *Billionaires Jeff Bezos and Richard Branson Have Now Both Gone to Space. Here’s the Difference Between Their Blue Origin and Virgin Galactic Flights*, CBS NEWS (July 20, 2021, 10:56 AM), <https://www.cbsnews.com/news/blue-origin-bezos-launch-richard-branson-space-flight-differences/> [<https://perma.cc/ZTY5-HXMR>].

<sup>4</sup> See *Launching a New Space Industry*, XPRIZE, <https://www.xprize.org/prizes/ansari> [<https://perma.cc/5PG4-WCTS>]; *Mojave Aerospace Ventures Wins the Competition That Started It All*, XPRIZE, <https://www.xprize.org/prizes/ansari/articles/mojave-aerospace-ventures-wins-the-competition> [<https://perma.cc/5EFZ-ECEN>].

<sup>5</sup> A suborbital flight is a flight in which the vehicle reaches outer space, but its trajectory intersects the atmosphere or the surface of the Earth, so that it does not complete one orbital revolution; it falls back to the Earth instead. See John M.

Virgin Galactic launched a small vehicle named VSS (*Virgin Space Ship*) *Unity* from an aircraft named VMS (*Virgin Mother Ship*) *Eve*, while Blue Origin vertically launched a single vehicle from the ground named *New Shepard*.<sup>6</sup>

Suborbital flights raise a myriad of legal questions. First and foremost, they take place at the border between air and outer space, but it is difficult to define this border.<sup>7</sup> At present, no official definition or delimitation exists in international law.<sup>8</sup> It is unclear whether international air or space law could apply to suborbital activities.<sup>9</sup> The legal implications of the qualification of this new activity have been analyzed in detail,<sup>10</sup> but have not yet led to concrete answers.<sup>11</sup> For the United Nations' (UN) Outer Space Treaty to apply, reaching orbit is not explicitly required.<sup>12</sup> Even if it does apply, international space law has several shortcomings such as the registration; legal status; and liability of operators, crew, and passengers.<sup>13</sup>

As further elaborated in Section II.A, applying international air law also presents difficulties because it is unclear whether the definition of "aircraft" contained in the Annexes to the Chicago Convention could cover rocket-powered vehicles.<sup>14</sup>

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Horack, *What's a Suborbital Flight? An Aerospace Engineer Explains*, CONVERSATION (July 9, 2021, 1:34 PM), <https://theconversation.com/whats-a-suborbital-flight-an-aerospace-engineer-explains-164279> [<https://perma.cc/3E69-MVFX>].

<sup>6</sup> See BLUE ORIGIN, *supra* note 1.

<sup>7</sup> See Horack, *supra* note 5.

<sup>8</sup> Steven Freeland, *Keen to Sign Up for Space Tourism? Here Are 6 Things to Consider (Besides the Price Tag)*, CONVERSATION (July 23, 2021, 1:22 AM), <https://theconversation.com/keen-to-sign-up-for-space-tourism-here-are-6-things-to-consider-besides-the-price-tag-164940> [<https://perma.cc/9FPX-UFC5>]; Anne-Sophie Martin & Steven Freeland, *A Round Trip to the Stars?: Considerations for the Regulation of Space Tourism*, 47 AIR & SPACE L. 261, 265–68 (2022).

<sup>9</sup> See Freeland, *supra* note 8.

<sup>10</sup> For a recent instance, see *id.* For some earlier publications, see Tanja Masson-Zwaan & Steven Freeland, *Between Heaven and Earth: The Legal Challenges of Human Space Travel*, 66 ACTA ASTRONAUTICA 1597, 1605 (2010); Stephan Hobe, Géraldine Meishan Goh & Julia Neumann, *Space Tourism Activities – Emerging Challenges to Air and Space Law?*, 33 J. SPACE L. 359, 363, 365–66 (2007).

<sup>11</sup> See Masson-Zwaan & Freeland, *supra* note 10, at 1598.

<sup>12</sup> Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, *opened for signature* Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty] (entered into force Oct. 10, 1967).

<sup>13</sup> See Masson-Zwaan & Freeland, *supra* note 10, at 1602–04.

<sup>14</sup> See Convention on International Civil Aviation, Dec. 7, 1944, 15 U.N.T.S. 295 [hereinafter Chicago Convention]. The Chicago Convention does not contain a definition of aircraft, but several of the Annexes to the Chicago Convention, which contain the Standards and Recommended Practices (SRPs), have a defi-

If suborbital flights do not cross borders, national law will apply.<sup>15</sup> In the case of vertical launch vehicles, such as Blue Origin's *New Shepard*, there is no crossing of borders or overflight of foreign territory,<sup>16</sup> and thus states can regulate the activity in the framework of national law—whether that is air law, space law, or a new hybrid law. For vehicles launched from an aircraft, such as Virgin Galactic's flights, the solution may be less evident.<sup>17</sup> Borders could be crossed, especially during flights originating in countries smaller than the United States such as those in Europe in which international law may apply.

So far, only a few states have started to regulate suborbital flights through national legislation,<sup>18</sup> and international law is still undecided about how to regulate suborbital flights.<sup>19</sup> It is becoming urgent to clarify the legal implications in terms of public law and address issues of safety, authorization, registration, and traffic management.

In terms of private law, the legal position of crew and passengers, liability, and insurance for damages to passengers and to third parties on the ground need to be addressed to allow this new industry to operate within a clear legal framework—where all stakeholders know the risks involved and how and at what cost they can protect themselves. In this context, private international air law instruments could be used, such as the 1999 Convention for the Unification of Certain Rules for International

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nition. Specifically, Annexes 7 and 8 define aircraft as “[a]ny machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth’s surface.” Int’l Civ. Aviation Org. [ICAO], *Aircraft Nationality and Registration Marks*, at 1, ICAO Doc. Annex 7 (6th ed. 2012); ICAO, *Airworthiness of Aircraft*, at I-1, ICAO Doc. Annex 8 (12th ed. 2018). For a useful summary of the Annexes to The Chicago Convention, see ICAO, *Annexes 1 to 18*, [hereinafter Annexes Summary], [https://www.icao.int/Documents/annexes\\_booklet.pdf](https://www.icao.int/Documents/annexes_booklet.pdf) [<https://perma.cc/S6FQ-3GHN>]; see also *infra* Part II.

<sup>15</sup> See Masson-Zwaan & Freeland, *supra* note 10, at 1600.

<sup>16</sup> See BLUE ORIGIN, *supra* note 1.

<sup>17</sup> See Gohd, *supra* note 5.

<sup>18</sup> In the United States, see, for example, 14 C.F.R. § 460 (2022); 14 C.F.R. § 205 (2022); see also *Human Spaceflight*, FAA, [https://www.faa.gov/space/human\\_spaceflight/](https://www.faa.gov/space/human_spaceflight/) [<https://perma.cc/UE7U-JXQX>] (May 17, 2022). In the United Kingdom, see, for example, Space Industry Act, (2018) c. 5, i, <https://www.legislation.gov.uk/ukpga/2018/5/contents> [<https://perma.cc/7XDG-S7ZZ>]. For an analysis of the UK Act, see Lesley Jane Smith & Ruairidh J.M. Leishman, *Up, up and Away: An Update on the UK’s Latest Plans for Space Activities*, 44 AIR & SPACE L. 1, 1–26 (2019).

<sup>19</sup> See Masson-Zwaan & Freeland, *supra* note 10, at 1602, 1604.

Carriage by Air (Montreal Convention)<sup>20</sup> or the Convention on Damage Caused by Foreign Aircraft to Third Parties on the Surface (Rome Convention).<sup>21</sup>

At some point, these flights will evolve into international point-to-point transportation of passengers and cargo via outer space, and therefore harmonization of national law is desirable.<sup>22</sup> Rather than applying different laws and requirements to different methods of suborbital flights, the legal system would be better served by one set of rules at both the national and international level that applies to similar activities even if different technologies are used—just like a turboprop is subject to the same rules as a jet plane.<sup>23</sup> Thus, a dedicated set of *sui generis* rules would best serve legal certainty and transparency.

After some deliberation on the qualification of suborbital flights as aviation or spaceflight, the consequences of applying air or space law and thoughts about the selection of the institution or organization that could be mandated with the regulation and management of suborbital flights are included in this Article. Then to illustrate the issues that will arise if uncertainty persists, this Article focuses on the private law topic of liability and insurance for damage to passengers and to third parties on the ground.

## II. AVIATION OR SPACEFLIGHT?

The first question is whether suborbital flights could fit in the current regimes of international air or space law. Both options are briefly discussed below.

### A. REGULATING SUBORBITAL FLIGHT AS AVIATION

It is uncertain whether the definition of aircraft in Annexes 7 and 8 of the Chicago Convention<sup>24</sup> could cover rocket-powered

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<sup>20</sup> See generally Convention for the Unification of Certain Rules for International Carriage by Air, May 28, 1999, 2242 U.N.T.S. 309 [hereinafter Montreal Convention].

<sup>21</sup> See generally Convention on Damage Caused by Foreign Aircraft to Third Parties on the Surface, Oct. 7, 1952, 310 U.N.T.S. 181 [hereinafter Rome Convention].

<sup>22</sup> See FAA, POINT-TO-POINT COMMERCIAL SPACE TRANSPORTATION IN NATIONAL AVIATION SYSTEM: FINAL REPORT 1 (2010), [https://www.faa.gov/about/office\\_org/headquarters\\_offices/ast/media/point\\_to\\_point.pdf](https://www.faa.gov/about/office_org/headquarters_offices/ast/media/point_to_point.pdf) [https://perma.cc/VU8Z-RPH2].

<sup>23</sup> See, e.g., 40 C.F.R. pt. 87 (2022).

<sup>24</sup> See Annexes Summary, *supra* note 14.

vehicles, as they do not derive support from reactions of the air; at least, they do not for some parts of the flight.<sup>25</sup> Because annexes are updated from time to time, the regime established under the auspices of ICAO could be expanded to cover commercial suborbital flights. After all, suborbital vehicles spend the largest part of their journey in airspace, crossing briefly through outer space.<sup>26</sup> That brief transit through the lowest part of outer space could be considered incidental to the larger part of the activity that takes place in airspace.<sup>27</sup>

Applying air law could have several advantages, including the fact that air law has a detailed private law regime addressing second- and third-party liability of the operator vis-à-vis passengers and third parties on the ground.<sup>28</sup> On the other hand, applying that very detailed body of law to an emerging industry may also cause a showstopper as an incident of overregulation.<sup>29</sup>

In Europe, an extensive European Union (EU) legal framework regulates public as well as private law aspects of air transport.<sup>30</sup> This framework would likely apply to suborbital flights launched from, or passing through, the airspace of EU States if they were labelled as air transport.<sup>31</sup> Although this would have the benefit of providing a comprehensive legal framework, the downside would be that the industry is stifled by detailed requirements regarding safety, consumer protection, and other aspects.<sup>32</sup>

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<sup>25</sup> *Rocket Propulsion*, NASA, <https://www.grc.nasa.gov/www/k-12/airplane/rocket.html> [<https://perma.cc/E8T4-KN66>].

<sup>26</sup> See FAA, THE U.S. COMMERCIAL SUBORBITAL INDUSTRY: A SPACE RENAISSANCE IN THE MAKING 2, [https://www.faa.gov/about/office\\_org/headquarters\\_offices/ast/media/111460.pdf](https://www.faa.gov/about/office_org/headquarters_offices/ast/media/111460.pdf) [<https://perma.cc/JT6E-MMC2>].

<sup>27</sup> Armel Kerrest & Lesley Jane Smith, *Commentary on Outer Space Treaty 1967: Article VII*, 1 COLOGNE COMMENT. SPACE L. 126, 140 (2010).

<sup>28</sup> See generally Montreal Convention, *supra* note 20; Rome Convention, *supra* note 21. For an analysis, see *infra* Part IV.

<sup>29</sup> Cf. Masson-Zwaan & Freeland, *supra* note 10, at 1606–07 (weighing different approaches regarding the speed at which outer space is explored and developed).

<sup>30</sup> See Dimitri de Bournonville & Joanna Langlade, *The Aviation Law Review: European Union*, L. REVS. (Aug. 18, 2021), <https://thelawreviews.co.uk/title/the-aviation-law-review-3/european-union> [<https://perma.cc/69FK-5QLC>]; see also discussion *infra* Parts IV–V.

<sup>31</sup> See de Bournonville & Langlade, *supra* note 30.

<sup>32</sup> See Masson-Zwaan & Freeland, *supra* note 10, at 1602–03.

## B. REGULATING SUBORBITAL FLIGHTS AS SPACEFLIGHT

It is difficult to determine whether suborbital flights can be considered a space activity because the concept of suborbital flights is not defined in the 1967 Outer Space Treaty.<sup>33</sup> The Treaty does not specify which activities are to be considered space activities, but reaching orbit does not appear to be a requirement.<sup>34</sup> None of the UN space treaties contain a definition of spacecraft, but there is one, albeit partial, definition of “space object” in the Liability Convention and the Registration Convention: “The term ‘space object’ includes component parts of a space object as well as its launch vehicle and parts thereof.”<sup>35</sup>

Suborbital flights are usually marketed as spaceflight, and because they aim to touch the edge of space, they could be considered a space activity.<sup>36</sup> Indeed, suborbital vehicles are destined to reach outer space just like any other space launch, except with lesser thrust and at least part of the trajectory does go through outer space.<sup>37</sup> So from a functional point of view, these flights have characteristics of space flights, and space law could apply. From a technical point of view, rocket planes bear many similarities to spacecraft, but do not apply the same aerodynamic principles as aircraft.<sup>38</sup> Space law could thus be applied to suborbital flights, but the regime lacks private law governing the relations between operators and passengers.<sup>39</sup> Space law is based on state responsibility and state-based liability and only allows private activity under the authorization and supervision of an appropriate state, as per Article VI of the Outer Space Treaty.<sup>40</sup> Moreover, application of the Registration Convention is problematic because it restricts its scope of application to “space ob-

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<sup>33</sup> Outer Space Treaty, *supra* note 12.

<sup>34</sup> *See id.*

<sup>35</sup> Convention on the International Liability for Damage Caused by Space Objects art. I(d), *opened for signature* Mar. 29, 1972, 24 U.S.T. 2389, 961 U.N.T.S. 187 [hereinafter Liability Convention]; Convention on Registration of Objects Launched into Outer Space art. I(b), *adopted* Nov. 12, 1974, 28 U.S.T. 695, 1023 U.N.T.S. 15 [hereinafter Registration Convention].

<sup>36</sup> *See, e.g.*, Horack, *supra* note 5; *see also Plane Facts: Rocket Planes*, PLANE & PILOT MAG., <https://www.planeandpilotmag.com/article/rocket-planes/> [https://perma.cc/56PF-B7D8] (Feb. 25, 2020).

<sup>37</sup> *See generally* PLANE & PILOT MAG., *supra* note 36.

<sup>38</sup> *See Rocket Aerodynamics*, NASA, <https://www.grc.nasa.gov/www/k-12/rocket/rktaero.html> [https://perma.cc/9EFH-42AM].

<sup>39</sup> *See* Outer Space Treaty, *supra* note 12.

<sup>40</sup> *Id.* art. VI.

ject[s] launched into earth orbit or beyond,"<sup>41</sup> which suborbital vehicles are not.

At the European level, contrary to air transport, there is no body of EU law applicable to commercial spaceflight.<sup>42</sup> The EU's mandate in the field of space is covered in Article 189 of the Treaty on the Functioning of the European Union (TFEU) and excludes harmonization of national space laws.<sup>43</sup>

### C. CONCLUSION

Thus, there is no clear conclusion on the suitability of air or space law to regulate suborbital flights. Both regimes present benefits and issues. Air law is likely most suitable as it has an elaborate system of private law,<sup>44</sup> which is lacking in space law. But a full-blown application of air law could have a stifling effect on the industry and would need adjustments, as pointed out in Part VII.

## III. INSTITUTIONAL ASPECTS

Besides questioning what field of law should apply in terms of substantive law, another issue remains regarding what international body would be best suited to oversee the regulatory aspects of suborbital flights in terms of safety, navigation, and other public law aspects, and whether this oversight could fall within international body's mandate. The International Civil Aviation Organization (ICAO) and the UN Committee on the Peaceful Uses of Outer Space (COPUOS) will be addressed below.

### A. A ROLE FOR ICAO?

ICAO is equipped with a comprehensive and tested treaty system contained in the Chicago Convention, and it is complemented by annexes containing Standards and Recommended

<sup>41</sup> See Registration Convention, *supra* note 35, art. V.

<sup>42</sup> See Tanja Masson-Zwaan, *Liability and Insurance for Suborbital Flights*, PROC. 5TH IAASS CONF. §§ 3, 4.2. (2012), <https://scholarlypublications.universiteitleiden.nl/access/item%3A2918293/view> [https://perma.cc/ZGN6-WU4Z].

<sup>43</sup> Consolidated Version of the Treaty on the Functioning of the European Union art. 189, Oct. 26, 2012, 2012 O.J. (C 326) 131–32 [hereinafter TFEU]; see also Tanja Masson-Zwaan, *Regulation of Sub-Orbital Space Tourism in Europe: A Role for EU/EASA?*, 35 AIR & SPACE L. 263, 266–67 (2010); Masson-Zwaan & Freeland, *supra* note 10, at 1601.

<sup>44</sup> See *infra* Part IV.

Practices (SARPs) for all aspects of international civil aviation.<sup>45</sup> These annexes could probably also accommodate suborbital flights in a meaningful and efficient manner. In 2000, the President of the ICAO Council stated:

The idea of adopting ICAO as a model, or expanding the mandate of ICAO to encompass outer space, has been raised before. This approach has merit. SARPs have proven effective in adapting to the dramatic transformation of civil aviation during the past 50 years or so. A global forum of nations is essential for achieving consensus on the management of outer space, and there already exists such a respected and time-honoured structure.<sup>46</sup>

In 2005, the ICAO President suggested that ICAO would be the most appropriate organization to regulate the safety of sub-orbital flights.<sup>47</sup> That same year, an ICAO Working Paper on the *Concept of Sub-Orbital Flights* stated that, should “foreign airspace(s) be traversed [by suborbital vehicles] and should it be eventually determined that suborbital vehicles [are] subject to international air law, pertinent Annexes to the Chicago Convention would in principle be amenable to their regulation.”<sup>48</sup> Neither the 2000 Statement nor the 2005 Working Paper have resulted in any follow-up actions. At the 2010 session of the COPUOS Legal Subcommittee, ICAO concluded that the 2005 document was still valid.<sup>49</sup> So far, ICAO has not taken any further action.<sup>50</sup>

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<sup>45</sup> See Chicago Convention, *supra* note 14. The Chicago Convention has 193 Member States. *The History of ICAO and the Chicago Convention*, ICAO, <https://www.icao.int/about-icao/history/pages/default.aspx> [<https://perma.cc/T5JZ-7PQ5>].

<sup>46</sup> Tanja Masson-Zwaan & Rafael Moro-Aguilar, *Regulating Private Human Suborbital Flight at the International and European Level: Tendencies and Suggestions*, 92 ACTA ASTRONAUTICA 243, 248 (2013) (quoting *Secure Data Link Communications*, 55 ICAO J. (2000), available at <https://www.icao.int/publications/Pages/ICAO-Journal.aspx?year=2000&lang=en> [<https://perma.cc/E9KG-MDND>]).

<sup>47</sup> Peter van Fenema, *Sub-orbital Flights and ICAO*, 30 AIR & SPACE L. 396, 396 (2005).

<sup>48</sup> ICAO, *Working Paper: Commercial Space Flights*, at Appendix A, para. 6.3, ICAO Doc. LC/36-WP/3-2 C-WP/12436 (May 30, 2005).

<sup>49</sup> See Comm. on the Peaceful Uses of Outer Space, Rep. on Its Forty-Ninth Session on the Concept of Sub-orbital Flights: Information from the International Civil Aviation Organization (ICAO), Mar. 22, 2010, to Apr. 1, 2010, at para. 2, U.N. Doc. A/AC.105/C.2/2010/CRP.9 (2010), [https://www.unoosa.org/pdf/limited/c2/AC105\\_C2\\_2010\\_CRP09E.pdf](https://www.unoosa.org/pdf/limited/c2/AC105_C2_2010_CRP09E.pdf) [<https://perma.cc/Y2S9-X83N>].

<sup>50</sup> See generally Masson-Zwaan & Moro-Aguilar, *supra* note 46, at 248–49.

It is not unthinkable that technical rules for suborbital flights could be adopted in the Annexes. After all, ICAO, whose constitution is laid down in the Chicago Convention,<sup>51</sup> was established to keep track with aviation developments through the updating of its Annexes and the establishment of new international arrangements. The aim of the Chicago Convention is to ensure that international civil aviation takes place in a safe and orderly manner,<sup>52</sup> and this Convention grants ICAO the authority to adopt SARPs governing suborbital flights.<sup>53</sup> Also, ICAO possesses rulemaking powers and authority on matters of navigation over the high seas and other oceanic areas where there is freedom of overflight.<sup>54</sup> These areas outside the jurisdiction of states are comparable to outer space.<sup>55</sup>

In terms of specific proposals to accommodate suborbital flights with the remit of ICAO, the definition of “aircraft” in the Annexes could be amended to include suborbital vehicles, a new Annex on “Space Standards” could be developed, or the Annexes governing navigation and collision avoidance could be amended.<sup>56</sup> ICAO could play a role in the coordination of air and space traffic and could eventually contribute to the definition of the outer limit of airspace.<sup>57</sup>

#### B. A ROLE FOR COPUOS?

So far, COPUOS has not taken a stand about suborbital flights, but there have been proposals to include this topic in its agenda. In 2007, a Working Paper on the “Future [R]ole and [A]ctivities of the Committee on the Peaceful Uses of Outer Space” mentioned a possible role for COPUOS in analyzing and regulating suborbital flights.<sup>58</sup> The impact of suborbital flights

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<sup>51</sup> Chicago Convention, *supra* note 14, pmbi.

<sup>52</sup> *Id.* art. 44.

<sup>53</sup> See Paul S. Dempsey & Michael C. Mineiro, *ICAO's Legal Authority to Regulate Aerospace Vehicles*, PROC. 3RD IAASS CONF. 6 (2008), [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1289547](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1289547) [<https://perma.cc/69KJ-J47Q>].

<sup>54</sup> See Chicago Convention, *supra* note 14, art. 12.

<sup>55</sup> See van Fenema, *supra* note 47, at 401.

<sup>56</sup> Dempsey & Mineiro, *supra* note 53, at 7–8; see also Masson-Zwaan & Free-land, *supra* note 10, at 1604.

<sup>57</sup> Cf. *Near Space: The Quest for a New Legal Frontier*, INT'L ASS'N FOR ADVANCEMENT SPACE SAFETY (2020), [https://www.mcgill.ca/iasl/files/iasl/near\\_space\\_-\\_the\\_quest\\_for\\_a\\_new\\_legal\\_frontier\\_0.pdf](https://www.mcgill.ca/iasl/files/iasl/near_space_-_the_quest_for_a_new_legal_frontier_0.pdf) [<https://perma.cc/JX8G-BGXX>] (noting the lack of any legally defined outer limit to outer space).

<sup>58</sup> Comm. On the Peaceful Uses of Outer Space, Rep. on Its Fiftieth Session on the Future Role and Activities of the Committee on the Peaceful Uses of Outer Space, June 6, 2007, to June 15, 2007, at ¶¶ 1, 36–38, U.N. Doc. A/AC.105/L.268

on space law was addressed on several occasions by the Legal Subcommittee's agenda item devoted to the definition and delimitation of outer space, and in discussions on the concept of aerospace objects.<sup>59</sup> However, no consensus has emerged,<sup>60</sup> and an agreement on the definition of suborbital vehicles or the legal regime that applies to suborbital flights seems unlikely to occur in the near future. Moreover, COPUOS does not have regulatory powers; so even if it succeeded in reaching a consensus, it likely would not be involved directly in the regulation of suborbital flights.<sup>61</sup>

### C. A JOINT ROLE?

In 2015, the two UN bodies in charge of aviation and space activities—ICAO and COPUOS—acting through their Secretariat, the Office for Outer Space Affairs (OOSA), jointly hosted an international meeting in Montreal to address some of the issues related to suborbital flights, the ground-breaking “ICAO–UNOOSA AeroSPACE Symposium.”<sup>62</sup> The event gathered over 300 participants, mostly from the aviation field.<sup>63</sup>

The aim was to bring together “aviation and space communities from around the globe to explore existing regulations and practices as well as safety management and systems engineering methods with regard to civil aviation, suborbital flights[,] and developments in space transportation.”<sup>64</sup> The event further

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(2007), [https://www.unoosa.org/pdf/limited/1/AC105\\_L268E.pdf](https://www.unoosa.org/pdf/limited/1/AC105_L268E.pdf) [<https://perma.cc/XHH2-MY4Q>].

<sup>59</sup> An example is the discussions about the questionnaire on possible legal issues regarding aerospace objects. See *Working Group on the Definition and Delimitation of Outer Space of the Legal Subcommittee*, UNOOSA, <https://www.unoosa.org/oosa/en/ourwork/copuos/lsc/ddos/index.html> [<https://perma.cc/R33W-8EEJ>].

<sup>60</sup> See Roy Balleste, *Worlds Apart: The Legal Challenges of Suborbital Flights in Outer Space*, 49 N.Y.U. J. INT'L L. & POL. 1033, 1041 (2017).

<sup>61</sup> See *Committee on the Peaceful Uses of Outer Space*, UNOOSA, <https://www.unoosa.org/oosa/en/ourwork/copuos/index.html> [<https://perma.cc/8XQF-Q8T8>].

<sup>62</sup> Tanja Masson-Zwaan, *UN's Aviation and Space Bodies Meet in Montreal to Discuss Future Activities at the Intersection of Commercial Air and Space Travel*, 40 AIR & SPACE L. 455, 455–56 (2015); see also *UNOOSA AeroSPACE Symposium 2015*, ICAO, <https://www.icao.int/meetings/space2015/Pages/default.aspx> [<https://perma.cc/M5ZS-KPW7>].

<sup>63</sup> See *ICAO SPACE 2015 - LIST OF PARTICIPANTS*, ICAO, [https://www.icao.int/Meetings/SPACE2015/Documents/SPACE%202015\\_LIST%20OF%20PARTICIPANTS\\_FINAL2.pdf](https://www.icao.int/Meetings/SPACE2015/Documents/SPACE%202015_LIST%20OF%20PARTICIPANTS_FINAL2.pdf) [<https://perma.cc/XJ5G-C9XZ>].

<sup>64</sup> Masson-Zwaan, *supra* note 62, at 456 (quoting ICAO, *State Letter*, at para. 1, ICAO Doc. AN1/64-14/86 (Nov. 12, 2014), <https://www.icao.int/Meetings/>

aimed to “[e]xplore challenges and opportunities related to emerging space activities and provide possible ideas on how to address them.”<sup>65</sup> Additionally, the event provided insight into the space and civil aviation sectors, including who is doing what, how to get involved, and when and why aviation regulators are involved.<sup>66</sup>

During the symposium, some speakers contended that ICAO could accommodate the regulation of suborbital flights but noted that adaptations may be required.<sup>67</sup> The space characteristics of suborbital flights should not be underestimated, and appropriate consultation and cooperation with COPUOS, the UN body in charge of space activities, remains essential.

A follow-up symposium was hosted by the United Arab Emirates in 2016,<sup>68</sup> and OOSA hosted a third event in 2017 in Vienna.<sup>69</sup> Since then, not much has happened. Perhaps the flights that took place in 2021 could reignite the flame.

At the time of the 2015 symposium, ICAO had also set up a “Space Learning Group” (LG), later joined by OOSA as official co-host of the LG.<sup>70</sup> The LG had no formal status; its main activities were sharing experiences and perspectives, assessing and taking stock, and then preparing next steps.<sup>71</sup> The LG integrated the aviation and space communities by convening regulators, operators, lawyers, scientists, and industry groups.<sup>72</sup> The members were appointed by Member States of ICAO, COPUOS,

SPACE2015/Documents/SL-ICAO%20%20UNOOSA%20Aerospace%20Symposium\_English.pdf [https://perma.cc/V77W-9GM7].

<sup>65</sup> *Id.* at 457 (quoting ICAO, *supra* note 64, at Attach. to State Letter, para. 2).

<sup>66</sup> For a list of speakers see *UNOOSA AeroSPACE Symposium: List of Confirmed Moderators and Presenters*, ICAO, <https://www.icao.int/Meetings/SPACE2015/Pages/Presenters.aspx> [https://perma.cc/EBK3-T8JS]; for all presentations see *UNOOSA AeroSPACE Symposium: Presentations*, ICAO, <https://www.icao.int/Meetings/SPACE2015/Pages/Presentations.aspx> [https://perma.cc/HZJ3-W6Y2].

<sup>67</sup> See Masson-Zwaan, *supra* note 62, at 459.

<sup>68</sup> For the event page see *UNOOSA AeroSPACE Symposium*, ICAO, <https://www.icao.int/meetings/space2016/Pages/default.aspx> [https://perma.cc/VF4Q-T5JY] (Mar. 31, 2016). For the relevant ICAO State Letter see ICAO Secretary-General, *Letter*, ICAO Doc. AN1/64-14/86 (Aug. 11, 2015), <https://www.icao.int/Meetings/SPACE2016/Documents/066e.pdf> [https://perma.cc/3T9X-JZJ5].

<sup>69</sup> See *United Nations / Italy Workshop on the Open Universe Initiative*, UNOOSA, [https://www.unoosa.org/oosa/en/ourwork/psa/schedule/2017/workshop\\_italy\\_openuniverse.html](https://www.unoosa.org/oosa/en/ourwork/psa/schedule/2017/workshop_italy_openuniverse.html) [https://perma.cc/68SC-BHPY].

<sup>70</sup> Masson-Zwaan, *supra* note 62, at 456.

<sup>71</sup> *Id.*

<sup>72</sup> *Id.*

or both.<sup>73</sup> To assist the LG, ICAO created a Space Program webpage containing two sections: one listing so-called Space Points of Contact & Knowledge Sharers (SPOCKS) and another assembling documents and other resources searchable by state or subject provided by regulators, industry groups, and others engaged in the sector.<sup>74</sup>

#### D. WHAT ABOUT THE EU?

The EU has not formally expressed its position on the issue of suborbital flights.<sup>75</sup> If the EU considered suborbital flights as aviation and suborbital vehicles as aircraft, this would entail the requirement of compliance with the EU air transport regime.<sup>76</sup> In terms of public law, the European Aviation Safety Agency (EASA) could play a role in the safety and certification of suborbital vehicles, if suborbital flights qualify as aviation.<sup>77</sup> Steps have been taken in the past to facilitate this, but the effort has been put on hold.<sup>78</sup>

Alternatively, EU Member States might consider characterizing suborbital flights as a space activity and regulate it under national space legislation. However, currently no space legislation of any EU Member State addresses suborbital flights.<sup>79</sup> Should the EU adopt national space legislation, harmonization

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<sup>73</sup> The initial group represented “China, Curacao, Finland, France, Italy, Japan, Malaysia, the Netherlands, Russia, Saudi Arabia, Spain, Switzerland,” the United Kingdom, and the United States, as well as the following organizations: ICAO, UNOOSA, EuroControl, EASA, the International Association for the Advancement of Space Safety (IAASS), and the International Coordinating Council of Aerospace Industries Associations (ICCAIA). *Id.* The author was a member on behalf of the Netherlands. *See id.* at 456 n.6.

<sup>74</sup> *See Space Transportation*, ICAO, <https://www4.icao.int/space> [<https://perma.cc/K7U5-SFFN>]. However, the group has been dormant since 2019, presumably due to other priorities.

<sup>75</sup> *See Masson-Zwaan, supra* note 43, at 267.

<sup>76</sup> *Id.* at 268.

<sup>77</sup> *See id.* at 269–70.

<sup>78</sup> Jean-Bruno Marciacq, Yves Morier, Filippo Tomasello, Zsuzsanna Erdelyi & Michael Gerhard, *Accommodating Sub-Orbital Flights into the EASA Regulatory System*, IAASS CONF. (2008), <https://www.yumpu.com/en/document/view/11509881/accommodating-sub-orbital-flights-into-the-easa-regulatory-congrex> [<https://perma.cc/B3G9-R9X9>].

<sup>79</sup> *See National Space Law*, UNOOSA, <https://www.unoosa.org/oosa/en/ourwork/spacelaw/nationalspacelaw/index.html> [<https://perma.cc/5HXX-B4RE>]. For a useful overview of national space legislation, see Julie Abou Yehia, *In Need of a European Regulation for Private Human Spaceflight*, 8 ESPI 1, 1–3, [https://www.files.ethz.ch/isn/124755/espi-perspectives\\_8.pdf](https://www.files.ethz.ch/isn/124755/espi-perspectives_8.pdf) [<https://perma.cc/8YUQ-A9H8>].

would be desirable, but the EU is not required to ensure harmonization of national space laws as per Article 189 of the TFEU.<sup>80</sup> It may be preferable to eventually adopt EU regulation on sub-orbital flights in Europe.

#### E. CONCLUSION

Of the global institutions that could play a role in regulating the public law aspects of suborbital flights at the international level, ICAO seems better suited and more flexible than COPUOS, but some form of cooperation between the two organizations would be useful. It is desirable and urgent to revive the LG and continue the collaboration between ICAO and COPUOS as the competent UN bodies for regulating international aviation and space activity. The competence of the EU to regulate suborbital flight will depend on whether the Member States might grant it the mandate to do so.

#### IV. LIABILITY

With a view towards analyzing private law aspects of suborbital flights, this Part addresses the liability regimes in air and space law for damages caused to persons. In international air law, a distinction is made between second-party liability, also referred to as contractual or passenger liability, and third-party liability, liability for damages caused to innocent bystanders.<sup>81</sup> In international space law, only third-party liability is regulated.<sup>82</sup>

##### A. AIR CARRIER LIABILITY

###### 1. *Second-Party Liability in International Air Law*

A detailed regime of air carrier liability for damages caused to passengers, also known as second-party liability, is laid down in the 1929 Warsaw Convention,<sup>83</sup> its various amendments, and the

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<sup>80</sup> See TFEU, *supra* note 43, art. 189.

<sup>81</sup> See Tanja Masson-Zwaan, *supra* note 42.

<sup>82</sup> See *id.*

<sup>83</sup> See Convention for the Unification of Certain Rules Relating to International Carriage by Air arts. 17–31, Oct. 12, 1929, 49 Stat. 3000, 137 L.N.T.S. 11 [hereinafter Warsaw Convention]. The Warsaw Convention has 152 State Parties. *Contracting Parties to the Convention for the Unification of Certain Rules Relating to International Carriage By Air*, ICAO, [https://www.icao.int/secretariat/legal/List%20of%20Parties/WC-HP\\_EN.pdf](https://www.icao.int/secretariat/legal/List%20of%20Parties/WC-HP_EN.pdf) [<https://perma.cc/ZZE7-RCX2>].

1999 Montreal Convention.<sup>84</sup> The regime evolved over time and includes extensive case law.<sup>85</sup>

The treaties apply to international carriage of persons, baggage, or cargo by aircraft for reward, and “international carriage” is defined as

any carriage in which, according to the agreement between the parties, the place of departure and the place of destination, whether or not there be a break in the carriage or a transshipment, are situated either within the territories of two States Parties, or within the territory of a single State Party if there is an agreed stopping place within the territory of another State, even if that State is not a State Party. Carriage between two points within the territory of a single State Party without an agreed stopping place within the territory of another State is not international carriage for the purposes of this Convention.<sup>86</sup>

This means that aircraft taking off from the Netherlands, flying over but not stopping in Belgium, and landing in the Netherlands count as domestic flights for the purposes of passenger liability under the 1999 Montreal Convention, and that activity therefore falls under national law.<sup>87</sup>

The nature of liability shifted over time as the aviation industry developed.<sup>88</sup> “In the early days, aviation was considered to be a new industry which necessitated protection of the market entrants, leading to a system of limited liability” as enacted in the Warsaw Convention.<sup>89</sup> The Warsaw Convention was amended variously, *inter alia* to increase the limits of liability.<sup>90</sup> For the carrier to be liable, there must be an “accident” under Article 17 of the Warsaw Convention.<sup>91</sup> In that case, the carrier must com-

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<sup>84</sup> See Montreal Convention, *supra* note 20, ch. III. The Montreal Convention has 137 state parties. *Convention for the Unification of Certain Rules for International Carriage by Air*, ICAO, [https://www.icao.int/secretariat/legal/list%20of%20parties/mtl99\\_en.pdf](https://www.icao.int/secretariat/legal/list%20of%20parties/mtl99_en.pdf) [<https://perma.cc/U4KC-24A8>].

<sup>85</sup> For an extensive analysis, see PABLO MENDES DE LEON, *INTRODUCTION TO AIR LAW* 149, 256–57 (10th ed. 2017).

<sup>86</sup> Montreal Convention, *supra* note 20, art. 1.1; *see also* Warsaw Convention, *supra* note 83, art. 1.

<sup>87</sup> Note that it would still be considered an international air service under the Chicago Convention as far as public law aspects such as safety or navigation are concerned. *See* Chicago Convention, *supra* note 14, arts. 5–6.

<sup>88</sup> *See* Masson-Zwaan, *supra* note 42, § 2.

<sup>89</sup> *See id.* (alteration in original).

<sup>90</sup> *See id.*; Gerald F. Fitzgerald, *The Four Montreal Protocols to Amend the Warsaw Convention Regime Governing International Carriage by Air*, 42 J. AIR L. & COM. 273, 278, 280 (1976).

<sup>91</sup> Warsaw Convention, *supra* note 83, art. 17.

pensate damages resulting from the accident in the event of death, wounding, or any other bodily injury sustained by a passenger while on the aircraft or while embarking or disembarking.<sup>92</sup> The term “bodily injury” has been interpreted by many cases around the world.<sup>93</sup>

Over time, the Warsaw Convention, and its various amendments, could no longer meet the requirements of the new era.<sup>94</sup> The industry matured; airlines began to operate more independently from governments. Thus, as a result, the Montreal Convention was adopted in 1999.<sup>95</sup> Its aim was to modernize and consolidate the Warsaw system.<sup>96</sup> It was necessary to strike a better balance between the interests of the carriers and those of the passengers.<sup>97</sup> A new two-tiered unlimited liability system was introduced, albeit with certain exceptions, such as contributory negligence or wilful misconduct by the passenger.<sup>98</sup> Liability insurance was made mandatory, and an obligation to make advance payments to victims was included to meet their immediate economic needs.<sup>99</sup> The development from limited to unlimited liability in aviation could serve as an example for suborbital flights.

## 2. *Third-Party Liability in International Air Law*

Third-party liability is liability of the carrier towards persons on the ground and property on the ground, i.e. parties with whom the carrier does not have a contract, as opposed to passengers.<sup>100</sup> This liability is addressed by the 1952 Rome Conven-

<sup>92</sup> *Id.*

<sup>93</sup> See, e.g., CYRIL-IGOR GRIGORIEFF, THE REGIME FOR INTERNATIONAL AIR CARRIER LIABILITY: TO WHAT EXTENT HAS THE ENVISAGED UNIFORMITY OF THE 1999 MONTREAL CONVENTION BEEN ACHIEVED?, at 84–99 (2021), <https://hdl.handle.net/1887/3240115> [<https://perma.cc/LG4E-6CEN>]; Nandini Paliwal, *Interpretation of the Term ‘Bodily Injury’ in International Air Transportation- Whether Recovery for Mental Injury Is Tenable Under the Warsaw System and Montreal Convention?*, EALA 1, 8, <https://eala.aero/wp-content/uploads/2017/11/EALA-Paper.pdf> [<https://perma.cc/5FJD-3HZH>] (citing *Eastern Airlines, Inc. v. Floyd*, 499 U.S. 530, 545 (1991)).

<sup>94</sup> Masson-Zwaan, *supra* note 42, § 2.2.

<sup>95</sup> *Id.*

<sup>96</sup> Montreal Convention, *supra* note 20, pmbl.

<sup>97</sup> *Id.*

<sup>98</sup> *Id.* arts. 20–21.

<sup>99</sup> *Id.* arts. 28, 50.

<sup>100</sup> See Rome Convention, *supra* note 21, arts. 1, 14; Protocol to Amend the Convention on Damage Caused by Foreign Aircraft to Third Parties on the Surface, Sept. 23, 1978, ICAO Doc. 9257, at art. 1 [hereinafter Montreal Protocol].

tion<sup>101</sup> and its 1978 Montreal Protocol.<sup>102</sup> These documents impose liability on the carrier subject to certain limits and proof of fault.<sup>103</sup>

In view of the lack of ratification of these instruments by the major aviation states, and because the limits of liability were considered too low and because of the single forum choice, the relevance of these instruments is limited.<sup>104</sup> “In practice . . . *national* law governs the settlement of third[-]party liability in aviation cases.”<sup>105</sup> The 2009 General Risks Convention may remedy this by introducing liability principles similar to those of the 1999 Montreal Convention.<sup>106</sup> But with only very few ratifications so far and the absence of ratification by major aviation states, the 2009 General Risks Convention has not yet entered into force<sup>107</sup> and its impact may remain limited as well.

### 3. *Air Carrier Liability in EU Law*

Air carrier liability in the EU is drawn up in Council Regulation (EC) No. 2027/97,<sup>108</sup> as amended in 2002 by EU Regulation (EC) No 889/2002,<sup>109</sup> to align the liability regimes of EU airlines with the Montreal Convention,<sup>110</sup> which is now an integral part of the EU legal order. Moreover, the EU protects passenger rights in Regulation (EC) No. 261/2004.<sup>111</sup> This

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<sup>101</sup> Rome Convention, *supra* note 21, arts. 1–14.

<sup>102</sup> Montreal Protocol, *supra* note 100.

<sup>103</sup> Rome Convention, *supra* note 21; Montreal Protocol, *supra* note 100, art. 1.

<sup>104</sup> See Allan I. Mendelsohn & Renée Lieux, *The Warsaw Convention Article 28, the Doctrine of Forum Non Conveniens, and the Foreign Plaintiff*, 68 J. AIR L. & COM. 75, 83 (2003); Gerd Rinck, *Damage Caused by Foreign Aircraft to Third Parties*, 28 J. AIR L. & COM. 405, 406, 409, 411 (1962).

<sup>105</sup> Masson-Zwaan, *supra* note 42, § 3.

<sup>106</sup> See Montreal Convention, *supra* note 20, arts. 20, 22; Convention on Compensation for Damage Caused by Aircraft to Third Parties pmbl., art. 4, May 2, 2009, DCCD Doc. No. 42 [hereinafter General Risks Convention].

<sup>107</sup> See General Risks Convention, *supra* note 106.

<sup>108</sup> Council Regulation 2027/97 of Oct. 9, 1997, Air Carrier Liability in the Event of Accidents, 1997 O.J. (L 285) 1 (EC).

<sup>109</sup> Regulation 889/2002 of May 13, 2002, Amending Council Regulation (EC) No 2027/97 on Air Carrier Liability in the Event of Accidents, 2002 O.J. (L 140) 1, 1, paras. 2–7 (EC).

<sup>110</sup> Masson-Zwaan, *supra* note 42, § 2.3.

<sup>111</sup> Regulation 261/2004 of Feb. 11, 2004, Establishing Common Rules on Compensation and Assistance to Passengers in the Event of Denied Boarding and of Cancellation or Long Delay of Flights, and Repealing Regulation (EEC) No 295/91, 2004 O.J. (L 46) 1, 1 (EC).

Regulation has been subject to a myriad of interpretations before courts in the EU.<sup>112</sup>

## B. LIABILITY FOR SPACE ACTIVITIES

Liability with respect to space activities is very different from liability in aviation.<sup>113</sup> “The provisions in the [space] treaties only concern third parties, i.e. non-contractual liability only.”<sup>114</sup> Second-party liability for damage to passengers or other contractual parties is not regulated by international space law.<sup>115</sup> The lack of a private international law regime governing the relationship between passengers and operators of spacecraft, and in particular a liability regime, is one of the main problems of applying space law to suborbital flights.<sup>116</sup>

Article VII of the Outer Space Treaty provides that launching states are internationally liable for damages caused by their space object or its component parts on Earth, in air, or in space to another state party or its natural or legal persons.<sup>117</sup> The Liability Convention confirms this third-party liability, i.e., the launching state is internationally liable for damage caused to another State Party.<sup>118</sup> The compensable damages are “loss of life, personal injury[,] or other impairment of health; or loss of or damage to [public or private] property.”<sup>119</sup> Liability is absolute if compensable damage occurs on the Earth’s surface or to an aircraft in flight<sup>120</sup> but is fault-based if it occurs somewhere else.<sup>121</sup> The liability is unlimited, i.e. there is no cap under the treaties; there is no direct liability of private operators for space activities; additionally, private third parties are not entitled to claim on

<sup>112</sup> See, e.g., MENDES DE LEON, *supra* note 85, 264–66.

<sup>113</sup> Masson-Zwaan, *supra* note 42, § 4.

<sup>114</sup> *Id.*

<sup>115</sup> The only indirect reference to passengers is that nationals of the launching state and foreign nationals participating in space activity cannot claim compensation. See Liability Convention, *supra* note 35, art. VII.

<sup>116</sup> See, e.g., Jürgen Cloppenburg, *Legal Aspects of Space Tourism*, in SPACE L.: CURRENT PROBS. & PERSPS. FOR FUTURE REGUL. 191, 193 (Marietta Benkő & Kai-Uwe Schrogl eds., 2005). On liability issues posed by suborbital human flight, see Stephan Hobe, *Legal Aspects of Space Tourism*, 86 NEB. L. REV. 439, 448–54 (2007); Michael Chatzipanagiotis, *The Impact of Liability Rules on the Development of Private Commercial Human Spaceflight*, PROC. 55TH IISL COLLOQUIUM L. OUTER SPACE 1, 4, 9–10 (2011).

<sup>117</sup> Outer Space Treaty, *supra* note 12, art. VII.

<sup>118</sup> See Liability Convention *supra* note 35, art. VIII.

<sup>119</sup> *Id.* art. I.

<sup>120</sup> *Id.* art. II.

<sup>121</sup> See *id.* art. III.

their own—only states can.<sup>122</sup> Contrary to air carrier liability, there is no case law to interpret the treaty provisions.<sup>123</sup>

Although liability under the space treaties is unlimited, national laws usually provide caps or limits to liability insurance, often in combination with insurance as a requirement to obtain a license.<sup>124</sup> This implies that the state will assume any risks beyond those limits, as it is subject to unlimited liability under the treaties.<sup>125</sup> So far, only one national space law addresses sub-orbital flights carrying passengers, and it imposes only third-party liability on carriers, subjecting passengers to a waiver of second-party liability.<sup>126</sup> EU law is still virtually non-existent in this respect, due to the limited mandate of the Union under the TFEU.<sup>127</sup>

### C. CONCLUSION

In terms of both second- and third-party liability in air law, a clear regime of operator liability exists in international, national, and EU law. In space law, the regime is much less developed, only covers third-party liability of states, and does not include passenger liability or direct liability of private operators.

## V. LIABILITY INSURANCE

Just like liability in air law is different from liability in space law, aviation insurance and space insurance are also very different.<sup>128</sup> They will be addressed in the following Sections.

### A. LIABILITY INSURANCE IN AIR LAW

Liability insurance in air law evolved from marine insurance and is a well-developed service industry with experienced brokers, insurers, and reinsurers all over the world.<sup>129</sup>

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<sup>122</sup> See *id.* arts. 8–14.

<sup>123</sup> See Joel A. Dennerley, *State Liability for Space Object Collisions: The Proper Interpretation of “Fault” for the Purposes of International Space Law*, 29 EUR. J. INT’L L. 281, 281–83 (2018).

<sup>124</sup> See A. Kerrest de Rozavel & F.G. von der Dunk, *Liability and Insurance in the Context of National Authorisation*, 78 SPACE, CYBER, & TELECOMMS. L. PROGRAM FAC. PUBL’NS 1, 3 (2011), <https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1077&context=spacelaw> [<https://perma.cc/E9PK-S8XF>].

<sup>125</sup> See *id.*

<sup>126</sup> See 14 C.F.R. § 205.5 (2022); see generally FAA, *supra* note 18.

<sup>127</sup> See Masson-Zwaan, *supra* note 43, at 267.

<sup>128</sup> See Masson-Zwaan, *supra* note 42, §§ 5–6.

<sup>129</sup> See generally MARGO ON AVIATION INSURANCE 4–5, 14–15, 31, 559 (KATHERINE POSNER, TIM MARLAND & PHILIP CHRYSAL eds., 4th ed. 2014) (discussing defining

### 1. *The Market*

Aviation insurance, including liability insurance, has a long history and many statistics are available.<sup>130</sup> “Insurance for second[-] or third[-]party liability can be mandatory under treaty law, national law[,], and . . . EU law,” as explained in the following three Sections.<sup>131</sup> Air carriers usually buy “insurance for multiple take-offs and landings over a certain period, e.g., a year of operations.”<sup>132</sup> The market is characterized by high demand and supply as well as competitive rates.<sup>133</sup> “Insurers benefit from clear liability rules,” which facilitate assessing the risks.<sup>134</sup>

Aviation insurers determine their rates based on several risk rating factors, including the area of operation, the jurisdiction concerned, the type of aircraft involved, the volume of turnover in the company, contractual obligations, claims history, and market conditions.<sup>135</sup> “Insurance is sold to carriers through insurance brokers, and the risk is usually spread throughout the market by reinsurers.”<sup>136</sup> “Rates for insurance to protect against claims from passengers (second[-]party liability) depend on the type of aircraft used, the flight duration, [and] applicable liability regime(s),” among other factors.<sup>137</sup> Damages covered may range from delays or lost luggage to fatal injury to passengers to costs for search and rescue.<sup>138</sup> “Insurance for carriers against liability for damage to third parties (innocent bystanders, but also public or private property on the ground) is readily available at reasonable cost terms.”<sup>139</sup>

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characteristics of aviation insurance); *see also* ALLIANZ, 100 YEARS OF AVIATION INSURANCE (2015), <https://www.agcs.allianz.com/news-and-insights/reports/100-years-of-aviation-insurance.html> [<https://perma.cc/5JHM-PWTM>].

<sup>130</sup> *See, e.g., Aviation Claims Developments*, ALLIANZ (Nov. 2019), <https://www.agcs.allianz.com/news-and-insights/expert-risk-articles/aviation-risk-report-2020-claims-developments.html> [<https://perma.cc/F338-PGW6>]; *General Aviation Insurance Market: Pricing and Risk Update - Q1 2021*, MARSH, <https://www.marsh.com/us/industries/aviation-space/insights/general-aviation-insurance-market-pricing-risk-update-2021-q1.html> [<https://perma.cc/8GKC-DF6N>].

<sup>131</sup> Masson-Zwaan, *supra* note 42, § 5.

<sup>132</sup> *Id.*

<sup>133</sup> *Id.*

<sup>134</sup> *Id.*

<sup>135</sup> *Id.*

<sup>136</sup> *Id.*

<sup>137</sup> *Id.* § 5.1.

<sup>138</sup> *Id.*

<sup>139</sup> *Id.* § 5.2.

## 2. *Second-Party Liability Insurance*

The Warsaw Convention does not impose compulsory insurance for air carriers against claims from passengers, but the Montreal Convention does.<sup>140</sup> “The idea behind this was to ensure that claimants were sufficiently protected against bankruptcy of the carrier and similar situations, so that they could enforce the rights afforded to them. Safety considerations were also taken into account.”<sup>141</sup> National legislation may also contain insurance provisions regarding second-party liability and is especially relevant for flights that do not qualify as international carriage under the Warsaw and Montreal Conventions.<sup>142</sup>

## 3. *Third-Party Liability Insurance*

The 1952 Rome Convention stipulates “that contracting states are entitled to require that the operator of an aircraft registered in another contracting state is insured against” damage caused to third parties on the ground, and contains “substantive provisions as to the insurance policy itself.”<sup>143</sup> States may impose insurance conditions on foreign airlines in bilateral air services agreements.<sup>144</sup> As seen earlier, national legislation often applies to third-party liability and may also contain insurance provisions regarding third-party liability.<sup>145</sup>

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<sup>140</sup> Montreal Convention, *supra* note 20, art. 50. The Montreal Convention provides: “States Parties shall require their carriers to maintain adequate insurance covering their liability under this Convention. A carrier may be required by the State Party into which it operates to furnish evidence that it maintains adequate insurance covering its liability under this Convention.” *Id.* Compare with Warsaw Convention, *supra* note 83.

<sup>141</sup> Masson-Zwaan, *supra* note 42, § 5.1.

<sup>142</sup> See *supra* Part IV. Some examples are the United States’ Aircraft Accident Liability Insurance Rules, 14 C.F.R. § 205 (2022), and the United Kingdom’s Civil Aviation (Insurance) Regulations 2005, SI 2005/1089. EU Member States refer to EU law in their national law, e.g., The Netherlands, Wet Luchtvaart 18 juni 1992, Stb. 1992, 368, Titel 7.4.

<sup>143</sup> Masson-Zwaan, *supra* note 42, § 5.2 (citing Rome Convention, *supra* note 21, art. 15). The Rome Convention provides:

Any Contracting State may require that the operator of an aircraft registered in another Contracting State shall be insured in respect of his liability for damage sustained in its territory for which a right to compensation exists under Article 1 by means of insurance up to the limits applicable according to the provisions of Article 11.

Rome Convention, *supra* note 21, art. 15.1.

<sup>144</sup> Masson-Zwaan, *supra* note 42, § 5.2.

<sup>145</sup> See *supra* Part IV; see also *supra* sources cited note 142.

#### 4. Air Carrier Liability Insurance in EU Law

As indicated in Section IV.A.3, several EU instruments address second- and third-party liability of air carriers, and they also include provisions on liability insurance. Regulation 1008/2008 provides that air carriers must comply with the insurance requirements specified in Regulation (EC) No. 785/2004.<sup>146</sup> The latter Regulation specifies that air carriers must be insured to cover liability in case of accidents with respect to passengers, luggage, cargo, mail, and third parties, and it defines the amounts of insurance needed.<sup>147</sup> As a result of the 1999 Montreal Convention for the EU coming into force in 2004, the minimum insurance requirements were adjusted to increase, if not do away with entirely, the limits of liability.<sup>148</sup> The most recent requirements are contained in Commission Delegated Regulation (EU) 2020/1118.<sup>149</sup>

### B. LIABILITY INSURANCE IN SPACE LAW

Contrary to aviation insurance, the field of space insurance is much less developed. Just like aviation insurance evolved from marine insurance, space insurance was first placed by the aviation market and then developed into an independent insurance branch.<sup>150</sup> Aviation and space insurance remain closely related though, and both products are often offered by the same brokers and insurers.<sup>151</sup>

#### 1. The Market

“The insurance industry began providing services to space operators in the mid-1960s. At that time these risks were still covered by the traditional aviation market.”<sup>152</sup> The space insurance sector has fewer customers and fewer statistics than aviation in-

<sup>146</sup> Regulation 1008/2008 of Sept. 24, 2008, Common Rules for the Operation of Air Services in the Community (Recast), pmbl., art. 4(h), 2008 O.J. (L 293) 3, 6 (EC).

<sup>147</sup> Regulation 785/2004 of Apr. 21, 2004, Insurance Requirements for Air Carriers and Aircraft Operators, 2004 O.J. (L 138) pmbl., arts. 4–7 (EC).

<sup>148</sup> See Masson-Zwaan, *supra* note 42, § 2.2.

<sup>149</sup> Commission Delegated Regulation 2020/1118 of Apr. 27, 2020, Amending Regulation (EC) 785/2004 of the European Parliament and of the Council on Insurance Requirements for Air Carriers and Aircraft Operators, pmbl., art. 1, 2020 O.J. (L 243) 2 (EU).

<sup>150</sup> See generally Masson-Zwaan, *supra* note 42, § 6.

<sup>151</sup> See ANDREA J. HARRINGTON, SPACE INSURANCE AND THE LAW: MAXIMIZING PRIVATE ACTIVITIES IN OUTER SPACE 1–14, 102–16 (2021).

<sup>152</sup> Masson-Zwaan, *supra* note 42, § 6.

surance.<sup>153</sup> Space insurance must be obtained for each launch, not for several launches over a certain time.<sup>154</sup> “Moreover, the severity as well as the frequency of losses is high, putting space activities often at the far right of the risk map.”<sup>155</sup> This, in turn, leads to high and volatile insurance rates that react significantly to major losses.<sup>156</sup> Lastly, there is not much certainty about the extent of liability “due to the vague rules and [the] absence of court interpretations.”<sup>157</sup> In short, the space insurance market has “some unique features”—such as a limited number of clients, the high premiums, a high severity of risks, the uncertain legal environment, and the lack of statistics—that influence rates.<sup>158</sup>

## 2. *Second-Party Liability Insurance*

Second-party or contractual liability insurance for damage caused by one space object to another could be purchased on a voluntary basis among contractual partners, but second-party insurance for contractual liability for operators of spaceflights does not yet exist because there have not been any “passengers’ with a contractual link to the operators up [until] now” and because of “the absence of space passenger liability rules.”<sup>159</sup>

## 3. *Third-Party Liability Insurance*

Third-party liability insurance does exist, but so far it is mainly for damage caused to property.<sup>160</sup> Third-party liability insurance covers damage claims by third parties brought against the launching state, which flows its liability down to private operators and requires them to buy insurance.<sup>161</sup> Thus, this insurance protects operators against the financial consequences of prop-

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<sup>153</sup> *Id.*

<sup>154</sup> *Id.*

<sup>155</sup> *Id.*

<sup>156</sup> *Id.*

<sup>157</sup> *Id.*

<sup>158</sup> *Id.*; see also PHILIPPE MONTPERT, CONSIDERATIONS ON SPACE LIABILITY INSURANCE (Mar. 22, 2010), <https://www.unoosa.org/pdf/pres/lsc2010/symp04.pdf> [<https://perma.cc/7UNJJB6S>]. Insurance brokers publish regular market surveys. See, e.g., *Space Insurance Market: Pricing and Risk Update – Q1 2021*, MARSH, <https://www.marsh.com/us/industries/aviation-space/insights/space-insurance-market-pricing-and-risk-update-2021-q1.html> [<https://perma.cc/JG7U-8BGE>].

<sup>159</sup> Masson-Zwaan, *supra* note 42, § 6.2.

<sup>160</sup> For a good overview see Ilias I. Kuskouvelis, *The Space Risk and Commercial Space Insurance*, 9.2 SPACE POL’Y 109, 109–120 (1993).

<sup>161</sup> Masson-Zwaan, *supra* note 42, § 6.3.

erty damage caused to a third party during the launch, in-orbit, or re-entry phase.<sup>162</sup> Insurance for liability occurring during the launch phase is usually included in the launch-services contract.<sup>163</sup> Insurance for liability occurring during in-orbit operations and the re-entry phase is usually relatively cheap, partly because damage in space is subject to fault liability, and in the absence of an agreed standard of fault or caselaw, it may be difficult to prove fault.<sup>164</sup> Like for second-party liability, because private commercial human spaceflight is still in its infancy, there is no real practice of third-party liability insurance for personal injury so far.<sup>165</sup>

### C. CONCLUSION

As far as air law is concerned, insurance against both second- and third-party liability is usually required under international, national, or EU law.<sup>166</sup> In space law, the topic is not addressed in international or EU law; only third-party liability insurance is usually covered in national law as a requirement to obtain a license, but that law does not include insurance for passenger liability.

## VI. LIABILITY AND INSURANCE FOR SUBORBITAL FLIGHT UNDER CURRENT LAW

After this overview of liability and insurance in the fields of aviation and space, the present Part focuses on the question of how to address liability and insurance in the context of suborbital flights. As previously discussed, there are no liability or insurance rules specific to suborbital flights, and there is no decision on whether these flights could or should fall under aviation liability and insurance regimes or space liability and insurance regimes.<sup>167</sup> Whereas all options are possible in principle,

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<sup>162</sup> *See id.*

<sup>163</sup> *See* FAA, LIABILITY RISK-SHARING REGIME FOR U.S. COMMERCIAL SPACE TRANSPORTATION: STUDY AND ANALYSIS, at 3-26 (Apr. 2022), [https://www.faa.gov/about/office\\_org/headquarters\\_offices/ast/media/faaliabilityrisksharing4-02.pdf](https://www.faa.gov/about/office_org/headquarters_offices/ast/media/faaliabilityrisksharing4-02.pdf) [<https://perma.cc/5HXM-LXNK>].

<sup>164</sup> *See id.* at 9-24, 10-3.

<sup>165</sup> *See* Sara M. Langston, *Suborbital Flights: A Comparative Analysis of National and International Law*, 37 J. SPACE L. 299, 324 (2011), <https://airandspace-law.olemiss.edu/pdfs/jsl-37-2.pdf> [<https://perma.cc/PV2N-DP5X>].

<sup>166</sup> Masson-Zwaan, *supra* note 42, §§ 2.3, 3.

<sup>167</sup> *Supra* Part V.

each also has drawbacks, and no option provides a perfect solution.

#### A. LIABILITY

Should it be decided that suborbital flight is more akin to aviation, and assuming that providers of suborbital flights can be considered as “carriers” under the 1999 Montreal Convention (which is still an open question), it must be determined whether suborbital flights fall under Article 1 of the Convention and qualify as “international carriage.”<sup>168</sup> It could well be that taking off in one state for a suborbital flight, leaving national airspace for a brief passage in outer space, and landing in that same state should not be seen as international carriage, but should be subject to national law for passenger liability purposes.<sup>169</sup> Should suborbital flight become international in the future, with the vehicle landing in another state than the one from where it took off, unlimited liability, as per the 1999 Montreal Convention, could be imposed on carriers for damage caused to passengers.<sup>170</sup> As far as third-party liability is concerned, the Rome Convention and the General Risks Convention are of limited relevance, while many national laws, as well as EU law, provide for third-party liability.<sup>171</sup>

Should it be decided that suborbital flight is closer to spaceflight, there is no international law imposing second- or third-party liability on the operator, as only states are liable.<sup>172</sup> While second-party liability does not exist at all in international space law, third-party liability for states does exist.<sup>173</sup> It is often passed on to private operators in national space laws, but these laws mostly apply to satellites and not passenger flights.<sup>174</sup> The only available legal framework that addresses commercial passenger flights is U.S. legislation; it provides for third-party liability but not second-party liability because of the “informed consent” pro-

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<sup>168</sup> See Montreal Convention, *supra* note 20, art. 1.

<sup>169</sup> See *supra* Part IV. However, the operator would need to comply with international law for public law aspects such as safety and navigation.

<sup>170</sup> See Montreal Convention, *supra* note 20, art. 1. Application of the Warsaw Convention would entail limited liability, but it often does not apply anymore. See Masson-Zwaan, *supra* note 42, § 2.1.

<sup>171</sup> See 14 C.F.R. § 205 (2022); Regulation 1008/2008 of Sept. 24, 2008, Common Rules for the Operation of Air Services in the Community (Recast), 2008 O.J. (L 293) 3 (EC).

<sup>172</sup> See Liability Convention, *supra* note 35, art. VIII.

<sup>173</sup> See *id.*

<sup>174</sup> See Masson-Zwaan, *supra* note 42, § 6.3.

cedure.<sup>175</sup> The United States “light touch” approach for liability means that the requirements imposed on operators are kept to a minimum and mainly serve to safeguard the safety of third parties and public property.<sup>176</sup> Passengers, the “second parties,” i.e., those who conclude a contract of carriage with an operator, are asked to provide informed consent.<sup>177</sup> By doing that, they declare that they understand the risks involved with the activity they are about to undertake, accept those risks, and will not hold the carrier or the state liable for any damage that might occur.<sup>178</sup> This amounts to a sort of waiver of liability.<sup>179</sup> It may be questionable whether a full waiver of liability in cases of personal injury or loss of life will be enforceable under U.S. law; other national laws so far do not address private human spaceflight.<sup>180</sup>

In short, if air law applies to suborbital flights taking off and landing in the same state and briefly passing through outer space, second- and third-party liability likely apply under national law and EU law. If space law applies, there is no relevant international law imposing liability on commercial carriers, and the only relevant national law imposes third-party liability but no second-party liability.

## B. INSURANCE

Should it be decided that suborbital flight is aviation that qualifies as international carriage, insurance to cover second-party liability is mandatory under the Montreal Convention.<sup>181</sup> Even if the flight does not qualify as international carriage, most national laws and EU law will also require second-party liability insurance.<sup>182</sup> As far as third-party liability insurance is con-

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<sup>175</sup> See FAA, *supra* note 18.

<sup>176</sup> See 14 C.F.R. § 460.53 (2022).

<sup>177</sup> Cf. FAA, *supra* note 18 (discussing how federal law requires operators to inform crew and passengers on space flights of the risks involved); see generally Tracey Knutson, *What is “Informed Consent” for Space-Flight Participants in the Soon-to-Launch Space Tourism Industry?*, 33 J. SPACE L. 105, 106–08 (2007).

<sup>178</sup> See Knutson, *supra* note 177, at 106–08.

<sup>179</sup> See *id.* at 122.

<sup>180</sup> See *id.* at 112. And when they do, it is not certain whether second-party liability insurance will become mandatory or whether states will follow the U.S. example and make travel conditioned on passengers signing informed consent forms. That may not be likely in the EU, considering the analogy of the strict passenger protection rules in air law. Masson-Zwaan, *supra* note 42, § 5.1.

<sup>181</sup> See Montreal Convention, *supra* note 20, arts. 1, 50.

<sup>182</sup> See Masson-Zwaan, *supra* note 42, § 2.3.

cerned, third-party liability insurance is mandatory under the 1952 Rome Convention and the General Risks Convention,<sup>183</sup> but their relevance is limited. However, most national laws as well as EU law require third-party liability insurance as well.<sup>184</sup>

Should it be decided that suborbital flight is spaceflight, there is no international law imposing any mandatory second- or third-party liability insurance on the operator. Under the only available national law in this field so far, i.e., U.S. law, “there is no obligation to insure against liability for damage to or loss of life of passengers.”<sup>185</sup> In Europe, “there is no obligation to insure against second[-]party liability” either because national laws so far do not address private human spaceflight.<sup>186</sup> Thus, second-party liability insurance so far is not mandatory if operations are considered a space activity.<sup>187</sup> The problem is that the only example of second-party liability insurance is in the aviation market.<sup>188</sup> If an operator wants to obtain, or becomes obliged to purchase, insurance to cover this risk, “it is likely to be placed in the aviation market.”<sup>189</sup> But it is not certain that similar rates and conditions from the aviation industry would apply because “the risk involved may be considered much higher.”<sup>190</sup> Insurance for third-party liability is mandatory in most national space laws, but those laws mostly apply to satellites and not passenger flights.<sup>191</sup> Here again, the only available model of national law that applies to passenger flights is U.S. legislation, and it provides for mandatory insurance for third-party liability.<sup>192</sup>

The above means that if air law applies, international law and national law will provide for mandatory second- and third-party liability insurance. If space law applies, there is no relevant international law, and the only available national law requires third-party liability insurance, but does not impose second-party liability insurance.

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<sup>183</sup> Rome Convention, *supra* note 21, art. 15; General Risks Convention, *supra* note 106, art. 9.

<sup>184</sup> Masson-Zwaan, *supra* note 42, §§ 2.3, 3.

<sup>185</sup> *Id.* § 8.

<sup>186</sup> *Id.*

<sup>187</sup> *Id.*

<sup>188</sup> *Id.*

<sup>189</sup> *Id.*

<sup>190</sup> *Id.*

<sup>191</sup> *See id.* § 6.3.

<sup>192</sup> *See id.* § 8.

## C. CONCLUSION

There are substantial differences between the various legal systems in air and space law, and in international, EU, and national law in the fields of liability and insurance for both second- and third-party liability. And applying a single system to suborbital flights may not provide a satisfactory solution. Some recommendations on a way forward will be formulated below in Part VII.

## VII. RECOMMENDATIONS

In the end, the questions remaining are whether to address liability for suborbital flights according to air or space law, and whether to place insurance on the aviation or the space market. Both regimes have positive and negative aspects.

Air law has a well-developed liability regime, both under international and national law, and is accompanied by an extensive body of caselaw.<sup>193</sup> The benefit of applying aviation liability law would be a high level of legal certainty and an operator-based liability system providing efficient protection for passengers and third parties.<sup>194</sup> However, the drawbacks include the fact that operators would have to comply with numerous rules that could impact the new industry and create financial barriers, among others. Suborbital flight is still in its infancy, and applying the full body of air law may delay growth.

On the other hand, international space law is state-based and does not cover all aspects of safety requirements and liability, leaving aside for the moment security and the protection of the environment. In all these areas, air law offers relatively elaborate provisions.<sup>195</sup> Neither international nor national space law contain rules on carrier liability.

In the long term, developing an international regime of *sui generis* rules on liability and insurance for suborbital flights would be preferable in terms of legal certainty.<sup>196</sup> This regime could be reflected in national law for flights that do not qualify as international carriage. Some effort at harmonization among national laws would be desirable to avoid the risk of fragmentation.

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<sup>193</sup> *Id.* § 2.

<sup>194</sup> *See id.*

<sup>195</sup> *See supra* Part IV.

<sup>196</sup> *See id.* § 9.

The *sui generis* regime could be based on air law, which is most advanced, but also borrow from space law to take into account the different characteristics of suborbital flights, and the regime could involve both ICAO and COPUOS.<sup>197</sup> This will likely take some time, but the industry will also take time to mature.<sup>198</sup> In the immediate future, flights will take place in the domestic context and will be subject to national law. During that time, liability and insurance of suborbital flights will be regulated at the national level as aviation or space activity, or as a combination of both. It is not unlikely that states that have already developed rules for suborbital flights will set the trend for other states and for the international regime.

Regarding second-party liability, the new international regime might initially provide for limited liability and move towards unlimited liability as the industry grows, as has been the case in air transport.

Third-party liability could be regulated internationally or left to national law. Until then, the U.S. “light touch” approach for liability seems best suited.<sup>199</sup> The safety of third parties and public property would be safeguarded, while passengers could be asked to sign an agreement of informed consent.<sup>200</sup> They can opt to purchase personal accident insurance before embarking on a suborbital flight to protect themselves. In fact, one insurance provider designed a personal insurance policy in 2012, but it is not known whether one has been sold yet.<sup>201</sup>

Regarding insurance, the new international regime eventually might provide for mandatory second-party liability insurance, af-

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<sup>197</sup> See *id.*; Masson-Zwaan, *supra* note 62, at 455.

<sup>198</sup> Masson-Zwaan, *supra* note 42, § 9.

<sup>199</sup> See 14 C.F.R. § 460.53 (2022).

<sup>200</sup> See FAA, *supra* note 18.

<sup>201</sup> Stephen Gandel, *Spaceflights for Richard Branson and Jeff Bezos Spur a Race for Insurers, Too*, N.Y. TIMES (July 9, 2021), <https://www.nytimes.com/2021/07/09/business/richard-branson-jeff-bezos-spaceflight-insurance.html> [https://perma.cc/K4DX-JT8C]. Customers of orbital commercial flights, e.g. flights to the International Space Station, are also likely candidates for personal insurance policies; for instance, see the Axiom flight with the first all-commercial crew to visit the International Space Station in April 2022. *The Next Giant Leap for Humanity Starts Here. And Now*, AXIOM SPACE, <https://www.axiomspace.com/ax1> [https://perma.cc/5ERD-SRJB]. It is not publicly known whether they have indeed purchased personal insurance. See Milton “Skip” Smith, Op-Ed, *Representing the Private Astronaut Is a New Step for Human Spaceflight – and for Space Lawyers*, SPACE NEWS (Mar. 1, 2021), <https://spacenews.com/op-ed-representing-the-private-astronaut-is-a-new-step-for-human-spaceflight-and-for-space-lawyers/> [https://perma.cc/ET5D-4UVC].

ter an initial period of applying the informed consent practice initiated by the United States. When second-party liability insurance becomes mandatory, the insurance market will probably take a pragmatic approach and place it on the aviation market, which has vast experience in this field, with necessary adaptations.

Third-party liability insurance will likely be mandatory from the start, and could be placed on either the space or the aviation insurance market, as both markets have experience and capacity in this field. The main problem for insurers will be the assessment of risks based on statistical market information, which is still unavailable. As one insurance expert said: “The big question for the insurance industry is whether this is more like aviation insurance or more like current space policies.”<sup>202</sup> But the expert went on to say that “[t]here hasn’t been a situation where insurance markets haven’t stepped up,” and there is now possibly enough data on rocket launches to know how to price these policies.<sup>203</sup> Ultimately, a typical suborbital insurance market will emerge—just as the space insurance market eventually arose alongside the aviation insurance market.

In any case, when suborbital flights are about to evolve into point-to-point transportation from one place on Earth to another via outer space, clear rules on liability as well as tailored insurance options for commercial suborbital flights are essential. The 2021 flights of Virgin Galactic and Blue Origin could have given a push towards some answers, but if anything, they have confirmed that the uncertainty persists.

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<sup>202</sup> See Gandel, *supra* note 201.

<sup>203</sup> See *id.*