Galactic Governance: The Role of Arbitration in Space Law and Space-Related Disputes*
การบริหารจัดการอวกาศ: บทบาทหน้าที่ของอนุญาโตตุลาการในกฎหมายอวกาศและข้อพิพาทที่เกี่ยวกับอวกาศ

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(Received: September 24, 2024; Revised: January 23, 2025; Accepted: April 9, 2025)

Abstract

Space law, an exciting and evolving area of international law, faces unique challenges with the rapid growth of private space activities, including satellite operations, space mining, and space tourism. Historically, space law was shaped by diplomatic and political interactions among states, leading to disputes being resolved through negotiations rather than formal legal mechanisms. However, the increasing involvement of private entities in space activities has shifted the focus toward arbitration as a means of dispute resolution. This article examines the role of arbitration in space-related disputes, highlighting its importance in a legal landscape where traditional methods may no longer suffice.

The discussion begins with an overview of the historical development of space law, including key international treaties such as the Outer Space Treaty, the Liability Convention, and the Moon Treaty. The article then explores the complexities of arbitration in space law, focusing on issues like liability, jurisdiction, enforcement, and confidentiality. Furthermore, it addresses how current arbitration frameworks, such as the Permanent Court of Arbitration's Optional Rules for disputes related to outer space,

* This research article is a part and compiles from Thesis "Legal Regulations of Space Tourism - An Examination of Current Space Law Regulations and Their Application to the Emerging Phenomenon of Commercial Space Travel" LL.D, Faculty of Law, Chulalongkorn University.

might be adapted to meet the demands of the private commercialization of space. The article concludes by discussing potential future approaches, including the establishment of specialized arbitration bodies, to create a more effective dispute resolution framework for the rapidly changing domain of outer space. This research aims to provide insight into whether existing legal mechanisms are sufficient or if a new, unified framework is necessary to address the emerging challenges in space governance.

Keywords: Space Law, Arbitration, ADR, Outer Space Disputes, International Law

บทคัดย่อ

กฎหมายอวกาศอันเป็นกฎหมายที่น่าจับตามองและกำลังพัฒนาในสาขากฎหมายระหว่างประเทศกำลังเผชิญหน้ากับความท้าทายแปลกใหม่เนื่องด้วยกิจกรรมส่วนบุคคลทางอวกาศ ซึ่งประกอบไปด้วยการปฏิบัติการของดาวเทียม การทำเหมืองอวกาศ และการท่องเที่ยวอวกาศ โดยอดีตนั้นกฎหมายอวกาศถูกพัฒนาจากการมีปฏิสัมพันธ์ทางการทูตและทางการเมืองระหว่างรัฐต่าง ๆ จนนำไปสู่ข้อพิพาทที่ถูกแก้ไขด้วยการเจรจามากกว่าการสร้างกลไกทางกฎหมายขึ้นมาอย่างเป็นรูปธรรม อย่างไรก็ตาม การที่องค์กรเอกชนเข้ามามีส่วนเกี่ยวข้องมากขึ้นในกิจกรรมทางอวกาศส่งผลให้อนุญาโตตุลาการถูกนำมาใช้เป็นกลไกในการระงับข้อพิพาทแทน บทความนี้จะพินิจพิจารณาบทบาทของอนุญาโตตุลาการในข้อพิพาทที่เกี่ยวข้องกับอวกาศโดยเน้นย้ำถึงความสำคัญจากมุมมองทางกฎหมายที่วิธีการระงับข้อพิพาทแบบดั้งเดิมอาจไม่เพียงพออีกต่อไป

ประเด็นถกเถียงจะเริ่มด้วยภาพรวมของพัฒนาการทางประวัติศาสตร์ของกฎหมายอวกาศ รวมถึงสนธิสัญญาระหว่างประเทศที่เกี่ยวข้องหลัก ๆ เช่น สนธิสัญญาอวกาศ อนุสัญญาความรับผิดและอนุสัญญาดวงจันทร์ จากนั้นบทความนี้จะวินิจฉัยความซับซ้อนของการอนุญาโตตุลาการในกฎหมายอวกาศ โดยจะเน้นความสำคัญไปที่ปัญหาต่าง ๆ เช่น ความรับผิด เขตอำนาจศาล การบังคับใช้ และการรักษาความลับ ยิ่งไปกว่านั้นจะกล่าวไปถึงโครงสร้างอนุญาโตตุลาการที่อาจต้องปรับเปลี่ยนในปัจจุบัน เช่น กฎเกณฑ์เสริมสำหรับการอนุญาโตตุลาการในข้อพิพาทเกี่ยวกับกิจกรรมทางอวกาศเพื่อตอบสนองต่อความต้องการของการค้าอวกาศโดยเอกชน และจะสรุปบทความนี้ด้วยการถกเถียงแนวทางที่เป็นไปได้ในอนาคต ซึ่งรวมไปถึงการจัดตั้งองค์กรอนุญาโตตุลาการเฉพาะทางที่จะสร้างกลไกในลักษณะการระงับข้อพิพาทที่มีประสิทธิภาพมากขึ้นสำหรับการเปลี่ยนแปลงที่รวดเร็วในอวกาศ การศึกษาค้นคว้านี้มุ่งที่จะแสดงข้อมูลเชิงลึกในประเด็นของกลไกทางกฎหมายที่มีอยู่นั้นเพียงพอแล้วหรือจำเป็นต้องมีการวางกลไกใหม่ที่มีความเป็นหนึ่งเดียวกันเพื่อรับมือกับความท้าทายที่เกิดขึ้นใหม่ในการบริหารจัดการอวกาศ

คำสำคัญ: กฎหมายอวกาศ, อนุญาโตตุลาการ, การระงับข้อพิพาท, การระงับข้อพิพาทเกี่ยวกับอวกาศ, กฎหมายระหว่างประเทศ

Galactic Governance: The Role of Arbitration in Space and Space Related Disputes

Space law has grown in complexity alongside the developments in space exploration and technology. Since the launch of Sputnik 1 in 1957, space activities have rapidly evolved, expanding into areas such as satellite technology, space tourism, and space mining. With these developments, potential legal disputes in outer space have become increasingly diverse and complex. Especially the increasing involvement of private entities in space operations has shifted the focus toward legal mechanisms for dispute resolution, including arbitration. This article examines the challenges of applying arbitration to space law, exploring whether a new legal framework is necessary or if existing mechanisms can adequately address the demands of outer space commercialization. The analysis begins with an overview of international space law and the mechanisms currently available for dispute resolution, followed by a discussion of emerging legal issues and possible solutions for the future.

Space law is a relatively new area of international law, and therefore, problems that we know from other areas of law are not as settled as we are used to. Given the rapid development of space technologies, we are facing a multitude of different activities. Whether it be satellite technology, which has been around since the launch of Sputnik 1 on 4 October 1957, or current developments, such as space mining and space tourism. Almost all activities in space have the potential for legal disputes, for example, if one satellite crashes into another one. However, due to its historical development, space law is heavily influenced by diplomatic and political interactions among states.[1] It is therefore understandable that because of its history, space conflicts were originally solved by diplomatic rather than by legal proceedings. This might change since we see more and more private actors on the stage of space activities. The question is, how this development will react to a historically underdeveloped area of peaceful settlement of space disputes in international law.

[1] Rossana Deplano, “The Peaceful Settlement of Space Disputes: Prospects and Challenges,” in *The Changing Character of International Dispute Settlement*, eds. Russell Buchan, Daniel Franchini, and Nicholas Tsagourias (Cambridge, UK: Cambridge University Press, 2023), 22.

Section A provides an introduction to arbitration in international space law, tracing the development of space law and explaining the role of arbitration in resolving disputes within this framework. Section B discusses specific challenges that arbitration faces in space-related disputes, including confidentiality, liability, jurisdiction, and the political implications of space activities. Section C examines current areas of space-related arbitration, such as satellite disputes, space mining, and space tourism. It also explores the existing state of space arbitration practice, assessing its limitations and potential future developments. Section D proposes approaches for enhancing space arbitration in the future. It evaluates the possibility of creating specialized bodies for space arbitration and considers the role of international institutions like the Permanent Court of Arbitration (PCA) and the International Chamber of Commerce (ICC). Section E offers a summary of the overall discussions, focusing on the increasing complexity of space activities and the need for a robust arbitration framework to manage the rising number of disputes.

A. Introduction to Arbitration in International Space Law

1. A short overview of International Space Law

Space law, as a recent development, has its origins in the soft law of the Cold War era. In 1955, President Dwight D. Eisenhower announced that the USA had set a goal to design a space object and to launch it into Earth's orbit using a rocket.[2] Two years later, on October 4, 1957, it was the Soviet Union that launched the small satellite Sputnik 1 into Earth's orbit. This 83 kg sphere caused a shock in the USA and was one of the highlights of the so-called 'Space Race.' The USA, by the way, sent their own first satellite into orbit on January 31, 1958.

This led both superpowers to approach the United Nations and each presented proposals for international cooperation in space matters, of course, each according to their own political ideology. On December 13, 1958, the UN General Assembly decided to establish an ad hoc committee for the peaceful uses of outer space.[3] Even at this stage, it was already expected that space would be used for peaceful purposes to promote international and scientific coordination. This committee also had the task of reporting on legal issues that might arise in the implementation of space exploration

[2] Walter Sullivan, *Angriff auf das Unbekannte: Das internationale geophysikalische Jahr* (Frankfurt am Main: Büchergilde Gutenberg, 1962), 423.

[3] United Nations General Assembly, Resolution 1348 (XIII), 1958.

programs. In this, the beginning of space law as a legal matter can be recognized.[4] From this ad hoc committee, the permanent UN Committee on the Peaceful Uses of Outer Space was established in 1959.[5] They confirmed the fundamental considerations for the peaceful use of outer space, which subsequently led to the permanent establishment of the 'Committee on the Peaceful Uses of Outer Space' (UNCOPUOS).[6] In the following months, several resolutions were adopted, which ultimately culminated in the Outer Space Treaty (OST), signed on January 27, 1967.

Space law essentially consists of five major international treaties, as well as additional agreements and resolutions. The five major space law treaties are characterized by comprehensive regulations and are mostly interconnected. They are as follows:

- Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, dated January 27, 1967,[7]
- Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space, dated April 22, 1968 ('Rescue Agreement' = RA),[8]
- Convention on International Liability for Damage Caused by Space Objects, dated March 29, 1972 ('Liability Convention' = LC),[9]
- Convention on Registration of Objects Launched into Outer Space, dated January 14, 1975 ('Registration Convention' = RC),[10]
- Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, dated December 18, 1979 ('Moon Treaty' = MT).[11]

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[4] Marcus Schladebach, *Weltraumrecht* (Tübingen: Mohr Siebeck, 2020), 119.

[5] Ernst Fasan, *Weltraumrecht* (Mainz: Krausskopf-Flugwelt-Verlag, 1965), 25.

[6] Marcus Schladebach, *Weltraumrecht*, 119.

[7] United Nations General Assembly, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*, UNGA Res. 2222 (XXI), 1966.

[8] United Nations General Assembly, *Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space*, UNGA Res. 2345 (XXII), 1967.

[9] United Nations General Assembly, *Convention on International Liability for Damage Caused by Space Objects*, UNGA Res. 2777 (XXVI), 1971.

[10] United Nations General Assembly, *Convention on Registration of Objects Launched into Outer Space*, UNGA Res. 3235 (XXIX), 1974.

[11] United Nations General Assembly, *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*, UNGA Res. 34/68, 1979.

It is generally acknowledged that the OST of 1967 forms the foundation for the legal discipline and is further specified by the subsequent treaties enacted later.[12]

2. Principles of Space Law

The legal status of outer space is established in Article I of the OST and sets the fundamental direction for subsequent regulations. According to Article I, Paragraph 1 of the OST, the exploration and use of outer space, including the moon and other celestial bodies, shall be conducted for the benefit and in the interest of all countries, irrespective of their economic and scientific development status. Outer space is defined as "the province of all mankind," meaning that it is a common space without sovereignty: it belongs to all states collectively and to no single state. No state may exercise sovereignty over outer space separately. This legal status is also found in other international regulations for areas beyond national jurisdiction, such as Antarctica, the high seas, and the deep seabed. The OST was influenced by the Antarctic Treaty of 1959, which emphasizes in its preamble that Antarctica shall be used exclusively for peaceful purposes.[13] This concept was also adopted in the MT of 1979 and the United Nations Convention on the Law of the Sea (UNCLOS) of 1982. The MT refers to the Moon and its resources as the 'Common Heritage of Mankind,' which represents a nuanced shift from the term 'province' to 'heritage.' Article 4, Paragraph 1 of the MT designates the Moon as the province of all mankind, which can be seen as a reference to the OST.

All states have equal access to outer space. This freedom of access is explicitly addressed in Article I, Paragraph 2, of the OST with regard to the landing on celestial bodies and forms the basis of the general freedom of access to outer space under Article I of the OST: those who are permitted to explore and use outer space must first be able to reach it. This right of access is independent of a state's technical, economic, or scientific capabilities. The communal principle also ensures access to states that currently lack the capability to travel to outer space. Thus, access is also available to states that are not currently planning space activities. This regulation emphasizes that access to outer space for all countries is granted "irrespective of their economic and scientific development." This legal position represents freedom of access, but it is not an obligation of the international community to technically and economically enable

[12] Marcus Schladebach, "Schwerpunktbereich – Einführung in das Weltraumrecht," *Juristische Schulung* no. 3 (2008): 217.

[13] Antarctic Treaty of 1.12.1959, 402 UNTS 71; BGBl. 1978 II S. 1517, United Nations, 1959.

access for less developed states.[14] The objection that only a few states worldwide can actually make use of this freedom of access is understandable. However, this does not lead to a claim by these states for support in space projects. Such an extensive interpretation of access that would require economic facilitation cannot be derived from Article I of the OST.

Article I of the OST establishes research freedom in outer space at several points. The treaty emphasizes that the primary interest of states is to explore the largely uncharted outer space. Therefore, one of the focuses of the treaty is research: both practical exploration through space activities (Paragraphs 1 and 2) and scientific research (Paragraph 3) are declared to be free. Practical exploration of outer space should be conducted for the benefit and in the interest of all countries, without discrimination, on an equal basis, and in accordance with international law. Research freedom allows for the free decision on the nature, form, and location of space-related research activities.[15] However, the treaty does not provide for specific support measures by the international community, such as funding individual research programs. The authority for free research in outer space is granted to both public and private actors. While, in the early years of spaceflight, only public institutions had the necessary resources for space research, the spectrum has now expanded. Major private space companies like Virgin Galactic, Blue Origin, SpaceX, and the Airbus Group have demonstrated that space research has increasingly shifted to the private sector. Article VI of the OST confirms that non-governmental space entities also have the freedom to conduct research in outer space.

Article I of the OST emphasizes the economic freedom of using outer space, which is granted to both state and private entities. This freedom encompasses all forms of use, including those related to Earth, such as Earth observation and satellite positioning. However, purely Earth-bound activities are excluded. The use of outer space should be for the benefit and in the interest of all countries, which could be interpreted as an obligation to socialize the benefits of use. In practice, however, the use is aimed at self-interest. An obligation to share profits would significantly restrict economic activities in space.[16] A similar concept in the UNCLOS of 1982 led to controversies and a subsequent

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[14] Marcus Schladebach, *Weltraumrecht*, 49.

[15] Wolfgang von Kries, *Bernhard Schmidt-Tedd, and Kai-Uwe Schrogl, Grundzüge des Raumfahrtrechts* (München: C. H. Beck, 2002), 18.

[16] Marcus Schladebach, *Weltraumrecht*, 51.

relaxation of the rules on profit distribution from deep-sea mining. The rejection of profit-sharing in the MT and the UNCLOS shows that states are not willing to bear the costs alone and share the benefits.[17] Therefore, Article I of the OST is interpreted in a way that allows for the economic use of outer space for one's own benefit.

According to Article II of the OST, outer space, including the moon and other celestial bodies, is not subject to national appropriation through claims of sovereignty, use, occupation, or any other means. This provision complements Article I of the OST in the realm of sovereignty. The prohibition of national appropriation in Article II has led to significant legal debates, such as whether placing a US flag on the moon constitutes a violation of this prohibition,[18] or whether the collection of lunar rocks, as permitted by the US Commercial Space Launch Competitiveness Act,[19] is legally permissible. The central legal question is whether Article II only prohibits national appropriation or any form of appropriation, including private appropriation.[20] Various exceptions to this prohibition are also discussed.[21]

In outer space, it is prohibited to place objects that carry nuclear weapons or other weapons of mass destruction into Earth's orbit. It is argued that this prohibition does not apply if such weapons are not involved or are not placed into orbit.[22] For instance, ballistic missiles and so-called orbital bombs are not covered by this restriction. Some of these regulatory gaps have been addressed through arms control agreements with limited duration.[23] According to Article IV, Paragraph 2 of the OST, the moon and other celestial bodies are subject to a prohibition on militarization. The so-called outer space must be used solely for peaceful purposes. However, if a state

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[17] Ibid.; Rüdiger Wolfrum, "Hohe See und Tiefseeboden (Gebiet)," in *Handbuch des Seerechts*, ed. Wolfgang Graf Vitzthum (München: C. H. Beck, 2006), Kapitel 4, Mn. 135.

[18] Wolfgang von Kries, *Bernhard Schmidt-Tedd, and Kai-Uwe Schrogl, Grundzüge des Raumfahrtrechts*, 18.

[19] *United States Commercial Space Launch Competitiveness Act,* Public Law No. 114–90, 129 Stat. 704, November 25, U.S. Government Publishing Office, 2015.

[20] Stephan Hobe, "Space Traffic Management – Some Conceptual Ideas," *Zeitschrift für Luft- und Weltraumrecht (ZLW)* 65, no. 1 (2016): 2f.

[21] Marcus Schladebach, *Weltraumrecht*, 57; Ricky Lee, "Article II of the Outer Space Treaty: Prohibition of State Sovereignty, Private Property Rights, or Both?," *Australian Journal of International Law* 11 (2004): 129.

[22] Marcus Schladebach, "Schwerpunktbereich – Einführung in das Weltraumrecht," 220.

[23] Wolfgang von Kries, *Bernhard Schmidt-Tedd, and Kai-Uwe Schrogl, Grundzüge des Raumfahrtrechts*, 258.

wants to use military personnel for scientific research, this is allowed, and the necessary equipment or facilities may be carried out and utilized.

The principle of rescuing astronauts is written down in the RC. This agreement establishes the obligation of states to assist astronauts in distress and ensure their safe return, reflecting a key humanitarian aspect of space exploration. According to the agreement, any state that becomes aware of an astronaut in distress, whether on the surface of the Moon, other celestial bodies, or in space, is required to provide necessary assistance and facilitate their return to their home country.[24] The agreement also extends to the return of space objects, ensuring that objects launched into outer space are returned to their respective states if they land on the territory of another country.[25]

The legal foundations for state responsibility in space activities derive from general international law. Article IV, Paragraph 1 of the OST states: "The States Parties shall be internationally responsible for national activities in outer space, including the Moon and other celestial bodies, whether such activities are carried out by governmental or non-governmental entities (...)." In any case, the actions of state organs are attributed to the state, encompassing all individuals and units who act officially on behalf of the state according to domestic law. The specific organizational or operational form is irrelevant; what matters is that the acting individual is officially integrated into the state's organizational framework and has been granted official authority.[26] Article VI, Sentence 1 of the OST extends international responsibility to space activities conducted by non-governmental entities as well. This means that space activities carried out by private companies fall under the international responsibility of the state that is a party to the treaty. There are no exceptions to state responsibility for violations, as the treaty maintains that any potentially unlawful actions are attributed to the contracting state. However, this assumption of international responsibility by the state for private entities cannot be entirely unconditional. The OST also anticipates that international organizations might operate in space. In such cases, Article VI, Sentence 3 of the OST stipulates that both the international organization and the contracting states to that organization are responsible for adhering to the treaty's provisions.

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[24] United Nations, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*, Article V Abs. 1 S. 2. 1967.

[25] United Nations, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*, Article V Abs. 2. 1967.

[26] Knut Ipsen, ed., *Völkerrecht*, 7th ed. (München: C. H. Beck, 2018), § 30, Rn. 7.

In addition to states and private actors, international institutions play a crucial role in the application and development of space law. The UNCOPUOS is the central body for discussing fundamental issues related to space.[27] Its initial task was to develop an international legal framework for outer space. The committee was mandated "to study the nature of legal problems which may arise from the exploration of outer space," and its findings were adopted as a UN General Assembly resolution in 1963.[28] Another key institution relevant to space law is the International Telecommunication Union (ITU), a specialized agency established under Article 57 of the UN Charter. The ITU is responsible for allocating radio frequency bands and the corresponding orbital positions for satellites. Following the advent of space exploration, UNCOPUOS urged the ITU in 1961 to regulate satellite communications, which was a logical step due to the technical interconnection between satellite positioning (space law) and satellite communications (communications law), leading to an expansion of the ITU's mandate.[29] The European Space Agency (ESA) was established by the ESA Convention on May 30, 1975.[30] Its goal is to promote a unified European space policy.[31]

Additionally, there are other space law-related institutions with more limited scopes of responsibility. These include the World Trade Organization (WTO), the World Intellectual Property Organization (WIPO), the International Civil Aviation Organization (ICAO), the International Maritime Organization (IMO), the World Meteorological Organization (WMO), the International Atomic Energy Agency (IAEA), the International Organization for Standardization (ISO), the International Institute for the Unification of Private Law (UNIDROIT), and the United Nations Educational, Scientific and Cultural Organization (UNESCO), which each have minor interactions with space-related matters.[32]

3. What is arbitration?

Arbitration is an alternative form of dispute resolution to litigation which does not require recourse to the courts. It is a consensual process in the sense that it will only apply if the parties agree it should. In summary, arbitration is one of the Alternative

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[27] Wolfgang von Kries, *Bernhard Schmidt-Tedd, and Kai-Uwe Schrogl, Grundzüge des Raumfahrtrechts*, 31.

[28] United Nations General Assembly, Resolution 1962 (XVIII), December 13, 1963.

[29] Gabriela Catalano Sgrosso, *International Space Law* (Florence: Logisma Editore, 2011), 434 ff.

[30] Outer Space Treaty 1297 UNTS 161, 187; BGBl. 1976 II, 1861, United Nations, 1967.

[31] Marcus Schladebach, "Schwerpunktbereich – Einführung in das Weltraumrecht," 218.

[32] Marcus Schladebach, *Weltraumrecht*, 123.

Dispute Resolution (ADR) processes where a neutral party is selected to decide, similar to a judge in court. However, the proceeding has a lower cost with less time to proceed, and is more flexible than a court proceeding.

Arbitration awards, meaning the result of the process, are enforceable in over 150 countries worldwide due to the application of the New York Convention on the Recognition and Enforcement of Foreign Arbitral Awards. There are two primary types of arbitration: institutional and ad hoc. Institutional arbitrations are administered by arbitration institutions. Proceedings are typically conducted under arbitration rules selected by the parties, which have been drafted by the chosen institution. Ad hoc arbitrations are arranged solely between the arbitrators and the parties without the administration of an institution. The parties must devise and manage the arbitration procedure themselves under the supervision of the tribunal. They may choose to adopt a pre-existing set of arbitration rules, such as the United Nations Commission on International Trade Law (UNCITRAL) Rules of Arbitration, or conduct proceedings according to bespoke rules specifically drawn up for the case.

Arbitration offers several advantages, making it a highly effective method for dispute resolution. Firstly, arbitration allows parties to choose a neutral venue and appoint independent arbitrators, ensuring an unbiased resolution process. Secondly, arbitration provides significant procedural flexibility, permitting parties to agree on the rules and procedures that will govern their arbitration. Thirdly, arbitration can often be quicker and cheaper than traditional court litigation due to its streamlined procedures and the finality of the awards. Moreover, arbitration hearings are conducted in private, and awards are typically not published. There are rules that allow a party to request the arbitral tribunal to restrict access to trade secrets or other confidential information that it submits to the tribunal.

When one would like to view space arbitration as an own category within the international arbitration field, it can be easily defined as a dispute resolution mechanism in relation to space activities or space related activities. As shown below, there are already cases where this becomes a topic, and surely there will be more cases of space arbitration given the rise of space related activities. Arbitration proceedings in this area generally follow the framework of traditional arbitration but are altered to address the challenges posed by space activities. These proceedings begin with the initiation of the arbitration process, where one party (“Claimant”) formally notifies the other party (“Respondent”)

of its intention to arbitrate. This notification includes a description of the dispute, the relief sought, and a reference to the arbitration agreement or clause that governs the dispute. The selection of the arbitral tribunal follows, based on the provisions of the arbitration agreement. Given the specialized nature of space-related disputes, the parties often choose arbitrators with expertise in space law, technology, or industry practices to ensure a tribunal that is knowledgeable and equipped to handle the complexities involved. Once the tribunal is constituted, preliminary steps are undertaken to establish the terms of reference for the arbitration. This involves agreeing on rules, timetables, the seat of arbitration, the language of the proceedings, and the applicable law. A preliminary meeting may be held to discuss these matters and address any concerns or motions, including jurisdictional objections that might arise given the international and often transnational nature of space disputes.

The next phase involves the submission of written statements and the gathering of evidence. The claimant submits a statement of claim, while the respondent provides a statement of defense. These documents outline the factual background of the dispute, the legal arguments, and the evidence each party intends to rely on. Following the submission of these documents, the parties engage in an exchange of relevant evidence, which may include technical data, satellite telemetry, contractual documents, communications, or expert reports. Depending on the procedural rules agreed upon, there may be a discovery process, where each party can request additional information and documents from the other side. The arbitration then proceeds to the hearing stage, where an oral hearing is conducted. During this hearing, both parties present their arguments, examine and cross-examine witnesses, and provide expert testimony. Due to the technical nature of many space disputes, expert witnesses the field of international space law, or orbital mechanics often play a role in the proceedings.[33] Technical demonstrations or simulations may also be presented to illustrate specific points, especially when the dispute involves highly specialized issues like satellite collisions, orbital debris, or launch failures. Following the hearing, the arbitral tribunal enters the deliberation phase, where the arbitrators privately discuss the evidence, arguments, and applicable laws to reach a decision. Once the tribunal reaches a decision, it issues a written arbitral award. This award includes the tribunal's findings of fact, legal conclusions, and any orders for relief, which

[33] Xu Zhihe and Li Tingwei, "The Use of Expert Witness in Arbitration from the Perspective of SHIAC," accessed 8 January 2025, https://arbitrationblog.kluwerarbitration.com/2020/04/29/the-use-of-expert-witness-in-arbitration-from-the-perspective-of-shiac/.

may involve monetary damages, specific performance, or other remedies. The award also typically addresses the allocation of costs, including arbitration fees and legal expenses.

The final stages of an arbitration proceeding involve the enforcement of the award and the possibility of appeal. The successful party may seek to enforce the award under the New York Convention on the Recognition and Enforcement of Foreign Arbitral Awards or other applicable legal frameworks. Given the global nature of space activities, enforcement may involve multiple jurisdictions, particularly if the parties or assets involved are located in different countries. There is also the possibility of challenging the award in the courts of the country where the arbitration took place or where enforcement is sought, although such challenges are generally limited to specific grounds such as procedural irregularities or lack of jurisdiction. The outcomes of space-related arbitration can vary widely depending on the nature of the dispute. Monetary compensation may be awarded for losses incurred due to a contractual breach, satellite collision, or launch failure. In some cases, the tribunal may order specific performance, requiring a party to undertake or refrain from specific actions, such as transferring control of a satellite, de-orbiting a spacecraft, or providing access to certain data.

B. Specific problems of arbitration in space

Space arbitration generally has three features that distinguish it from “normal” arbitration and make national courts, therefore, not optimistically responsible. Firstly, it is a highly technical field, and the arbitrator should have deep technological knowledge about the case, second, it is international since it is not very common for an operator to act alone, and lastly, it is confidential when it comes to dual-use technology, meaning technology, that can be used for civilian and military purposes. International arbitration is quite common in commercial disputes if the parties set up a contract between them that includes arbitration rather than court proceedings.[34] Besides this, there are core principles of both space law and international arbitration that are important to observe in space-related disputes.

[34] See *General clauses and conditions of the European Space Agency*, especially clause 35(2).

1. Confidentiality

As mentioned above, confidentiality is an important aspect of arbitration in general and is not that specific for space-related disputes. This confidentiality is crucial for all types of contractual disputes within the industry, including those related to satellite purchase agreements or launch services agreements. Typically, details of disputes that advance to arbitration in the space sector are disclosed through press releases issued by the involved companies or through financial statements that address receivables or allowances.[35] However, these disclosures are generally broad and designed to meet public disclosure requirements while adhering to contractual confidentiality clauses. Consequently, the specifics of the dispute are usually kept confidential.[36] The main exception to this confidentiality occurs when parties seek to challenge or enforce an arbitration award, as in the case of the Devas arbitrations.[37] In such instances, the party contesting or seeking to enforce the award must present the award as evidence in court, which makes both the arbitral decision and detailed information about the dispute publicly accessible.

2. Applicable Laws and Jurisdiction

As it can be difficult to define where space starts and what legal system may be applicable to a spacecraft, it can be challenging to define the applicable law, given that space is regarded as the province of mankind. Of course, this problem is simplified when the arbitration is about any contractual agreements that take place on earth and, therefore, help determine the correct jurisdiction. Furthermore, the jurisdiction in those cases is often agreed upon in writing. In any case, export controls may apply since the space industry is highly regulated, and the machines manufactured or used are often of a dual-use nature. Additionally, frequency bands and geostationary orbit slots are allocated by the ITU to states, which are then distributed to private entities according to national regulations. This results in numerous public law provisions affecting contractual relationships within the industry. Consequently, space industry contracts often require one party to secure the necessary export permits and frequency or orbit allocations. This may help with determining the applicable law.

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[35] Jan Frohloff, "Arbitration in Space Disputes," *Arbitration International* 35, no. 3 (2019): 325.

[36] Marlon Meza-Salas, "Confidentiality in International Commercial Arbitration: Truth or Fiction?," accessed 8 January 2025, https://arbitrationblog.kluwerarbitration.com/2018/09/23/confidentiality-in-international-commercial-arbitration-truth-or-fiction/.

[37] See below C. 1.a.

3. Politics, Sovereignty, and National Challenges

Space activities are inherently political due to the involvement of states or companies and the strategic interests they represent. This political dimension poses several challenges for arbitration in space, potentially undermining the neutrality and effectiveness of arbitration as a dispute resolution mechanism. Space activities often fall within the purview of national space agencies, which are either state-owned or state-backed. As a result, when disputes arise, they are not purely private matters but rather issues that touch upon national sovereignty and security. States may invoke sovereignty to resist arbitration or refuse to recognize and enforce arbitral awards that they perceive as infringing on their national interests.[38] This tension is particularly evident in situations where arbitration may require decisions on matters like the use of space resources, the positioning of satellites, or space traffic management, all of which have strategic implications for state actors. States consider outer space activities as an extension of their sovereignty and national interests, making them cautious of international dispute resolution mechanisms that might limit their autonomy.[39] In space arbitration, especially when states or state-owned entities are parties, political considerations can significantly influence the proceedings. Governments may exert pressure on arbitrators, directly or indirectly, to sway the outcome in their favor. A case in point is the MT. It was not widely ratified because states with active space programs viewed its provisions as potentially constraining their national interests. This demonstrates how political considerations can shape international agreements and, by extension, the mechanisms available for dispute resolution in space. In arbitration, similar political dynamics may surface, potentially hindering the effective resolution of space disputes.

4. Liability

Liability is a central issue in space activities, governed by a legal landscape involving international treaties, national laws, and private contracts. Several aspects of liability present problems for effective dispute resolution through arbitration, primarily because of the unique characteristics of space operations and the overlapping jurisdictions and regulations involved. The liability regime in international space law is primarily

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[38] Stephen Gent, "The Politics of International Arbitration and Adjudication," *Penn State Journal of Law & International Affairs* 2, no. 1 (2013): 66.

[39] Nandasiri Jasentuliyana, *International Space Law and the United Nations* (The Hague: Kluwer Law International, 1999), 230.

outlined in the LC. It establishes that states are internationally liable for damages caused by their space objects, both on the surface of the earth and in outer space. Moreover, the LC imposes "absolute liability" on launching states for damage on the Earth's surface or to aircraft, while "fault-based liability" applies to damage caused in outer space. This distinction introduces complexity into arbitration proceedings, as parties may need to establish fault, especially in space-related incidents involving private entities. Since arbitration typically involves private parties rather than states, aligning liability principles under the treaty with commercial contractual obligations can be problematic. Private space actors often use contracts to outline liability and indemnification terms, which can complicate arbitration. These contracts may include provisions that attempt to allocate risk, limit liability, or mandate indemnification. However, given the high-risk nature of space activities, liability caps, and indemnity clauses in these contracts can lead to disputes over their enforceability in arbitration. For example, if such a contract contains cross-waivers of liability where each party agrees not to claim against others for damage arising from space activities. These cross-waivers are mandated under national laws, such as the U.S. Commercial Space Launch Act, which aims to limit the liability of space operators. However, in an international arbitration context, enforcing these waivers can be complicated by differing national legal frameworks and public policy considerations. This problem is further compounded when third-party damages are involved, as the contracts' cross-waiver provisions may not extend to third parties, raising questions about how liability should be allocated.[40] According to the LC, a state bears international responsibility for its national space activities, whether conducted by governmental or non-governmental entities. This state responsibility means that private disputes involving third-party claims can quickly escalate into international matters involving state liability. If a private space company causes damage to a third party on Earth, the injured party might pursue claims against the state under the LC, while the state, in turn, may seek recourse through contractual arbitration clauses with the private entity.[41] This situation creates a web of potential liabilities and multiple forums for dispute resolution, undermining the efficiency of arbitration.

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[40] Tanja Masson-Zwaan, "Liability and Insurance for Suborbital Flights," in *A Safer Space for a Safer World*, ed. Lodewijk Ouwehand, ESA Special Publication 699 (Noordwijk, The Netherlands: European Space Agency, January 2012), 8.

[41] Ram Jakhu and Joseph Pelton, *Space Safety Regulations and Standards* (Amsterdam: Elsevier, 2017), 47.

5. Investment

Investments in space raise complex economic questions when disputes arise. In the context of arbitration, the resolution of these disputes is complicated by issues related to high-value investments, unpredictable market dynamics, and the legal landscape of space commerce. Space activities require substantial capital investment, with long development cycles and uncertain returns. The significant financial risks involve issues such as financing, intellectual property, licensing, and contract performance. For instance, the cost of launching a satellite can run into hundreds of millions of dollars, and disputes over launch failures, delays, or satellite malfunctions can involve extensive claims for damages or lost revenue. Determining the appropriate compensation or damages in cases involving failed launches, damaged satellites, or unfulfilled service contracts can be challenging, as it often requires expert evaluation of technical and financial factors.[42]

Many space-related investments are cross-border, involving international partnerships and investments in space infrastructure. Investors often seek protection through bilateral investment treaties or other international investment agreements, which may include provisions for investor-state dispute settlement mechanisms, often conducted through arbitration. However, enforcing these investment protection provisions can be problematic when space activities are involved due to overlapping jurisdictions and the involvement of sovereign states. States may resist arbitration proceedings brought by private investors under bilateral treaties, especially if the dispute touches on sensitive issues like national security, space policy, or strategic economic interests. This resistance may be based on claims of sovereign immunity or arguments that certain space activities fall within the scope of state regulatory powers. For instance, if a state introduces new regulations on satellite spectrum usage that adversely affect a foreign investor, the investor may seek arbitration under a bilateral treaty. However, the state could argue that the regulation is a legitimate exercise of its sovereignty, complicating the arbitration proceedings.[43] As highlighted by recent surveys, while existing arbitration frameworks are "adequate," there remains an "opportunity for players in the arbitration market [...] to develop a reputation for comparative expertise in space-related dispute resolution."[44]

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[42] See Francis Lyall and Paul B. Larsen, *Space Law: A Treatise*, 2nd ed. (London: Routledge, 2018), 462-465.

[43] Magdalena Bas, "Back to Sovereignty? Policy Space in Investor-State Dispute Settlement," *Revista Brasileira de Política Internacional* 65, no. 2 (2022): 4–6.

[44] Ben Love and Sagar Gupta, "Investor-State Space Arbitration Rules," accessed 15 September 2024, https://space-arbitration.com/investor-state-space-arbitration-rules/.

6. Enforcement awards

Enforcement of arbitral awards is a central issue in international arbitration. An arbitration award is the final decision made by an arbitral tribunal in a dispute. It is similar to a court judgment and may include rulings on the rights and obligations of the parties, orders for the payment of damages, or other forms of relief.[45] A significant obstacle in enforcing arbitral awards in space disputes is the intersection of state sovereignty with international commercial interests. Enforcement can become difficult when states invoke sovereignty or diplomatic immunity to resist compliance with an arbitral award, especially in disputes implicating national interests or security.[46] Current frameworks, such as the PCA Optional Rules attempt to address this by including an automatic waiver of sovereign or other immunity when states or intergovernmental organizations are parties to the arbitration. Arbitral awards in space-related disputes are typically not publicly disclosed, making it difficult to assess how often enforcement issues arise and how they are resolved. This lack of transparency creates challenges for future disputes, as parties have limited precedent to rely upon when arguing for or against enforcement. It also hinders the development of best practices and standards for enforcing awards in the space sector. The effectiveness of current frameworks in addressing enforcement issues remains uncertain. Developing specialized institutions or enhancing the capacity of existing arbitral bodies to handle space-related enforcement could provide a path forward.

C. From Earth to Orbit-Space Disputes

1. Current areas of space-related arbitration

a. Satellites

Currently, the most prominent areas where disputes can arise and give space to arbitration are related to satellites. As of August 2024, there are over 10,000 active satellites currently in orbit around the Earth. Most of these satellites are in Low-Earth orbit, ranging from 400 to 1,200 kilometers above the planet's surface. A significant portion

[45] Alan Redfern and Martin Hunter, *Law and Practice of International Commercial Arbitration*, 4th ed. (London: Sweet & Maxwell, 2004), 442.

[46] Ylli Dautaj, "Enforcing Arbitral Awards Against States and the Defense of Sovereign Immunity from Execution: A U.S. Perspective," *Penn State Journal of Law & International Affairs* 11, no. 2 (2023): 98–105.

of these active satellites, around two-thirds, belong to SpaceX's Starlink constellation.[47] Satellites serve various sectors, including television, telecommunications, navigation, scientific research, security, development, and climate and environmental monitoring. Disputes involving satellites may arise over matters such as contracts for satellite launches and deployments, operational and service agreements, or issues related to spectrum allocation and frequency interference, and therefore follow "the whole life cycle of a satellite"[48], starting with the late delivery of satellites[49] because the satellite can only make money if it's in space. This is a highly technical and difficult process, and because of that, a financial risk for all parties involved. In most cases, the company that is building the satellite is not the one flying it into space. If the carrying party cannot provide this launching service, it could lead to arbitration.[50] Another field of arbitration is after the launch when the satellite in space is either not in the correct spot or is not working at all. Even if the manufacturer is contractually ending his liability with the launch, they still would need to prove that the defect is not their fault. In the arbitration of Thuraya Satellite Communications vs. Boeing Satellite Systems International for example, Thuraya could not prove that Boeing's manufactured satellite was faulty.[51] Further points of arbitration could cover the sale and purchase of satellites already in orbit, the lease of orbital satellites, and the right to operate the satellite at a specific position.

One special field within the satellites is investment arbitration, meaning a specialized form of arbitration that involves resolving disputes between foreign investors and host states. It is typically used to address conflicts arising from investments made by individuals or companies in a foreign country.[52] Private companies cannot obtain a spot for satellite launching from the International Telecommunication Union by themselves but have to rely on their state and their national telecommunication regulatory

[47] SpaceWatch Global, "Look Up: Space Reports More Than 10,000 Active Satellites in Orbit," accessed 26 August 2024, https://spacewatch.global/2024/06/look-up-space-reports-more-than-10000-active-satellites-in-orbit.

[48] Jan Frohloff, "Arbitration in Space Disputes," 309.

[49] Such as in Space Communication Ltd. v. Israel Aerospace Industries Ltd., discussed in Jan Frohloff, "Arbitration in Space Disputes," 310.

[50] As in Avanti Communications Group vs. Space Exploration Technologies, see Avanti Communications Group vs. Space Exploration Technologies, see SpaceNews Staff, "Avanti Wins Arbitration Award Against SpaceX," accessed 26 August 2024, https://spacenews.com/avanti-wins-arbitration-award-against-spacex/.

[51] Jan Frohloff, "Arbitration in Space Disputes," 313.

[52] Andrea K. Bjorklund, "The Emerging Civilization of Investment Arbitration," *Dickinson Law Review* 113, no. 4 (2009): 1269.

authority. Therefore, private actors and states have to work together, which could lead to tensions. One prime example of this practice is the Devas Arbitration, a series of international arbitration cases arising from the termination of a contract between Devas Multimedia, a private Indian company, and Antrix Corporation, the commercial arm of the Indian Space Research Organization. This deal was designed to enable Devas to provide multimedia services across India using a hybrid satellite and terrestrial communication system.[53] In 2011, Antrix terminated the contract following a decision by the Indian government, which cited reasons of national security and public interest. Devas claimed that this termination was unjust and initiated arbitration proceedings under the ICC. In 2015, an ICC tribunal ruled in favor of Devas, finding that Antrix had wrongfully terminated the contract and awarding Devas approximately $562.5 million in damages, plus interest.[54] Following the ICC award, Devas's investors pursued additional claims under bilateral investment treaties that India had signed with Mauritius and Germany, mainly because of subcontractors. They argued that the actions of the Indian government violated their rights as foreign investors. These disputes were arbitrated under the rules of UNCITRAL.[55] In 2016, a tribunal under the PCA in Den Haag awarded Devas's Mauritius investors around $111 million plus interest. Similarly, in 2020, a tribunal under the Germany-India treaty also ruled in favor of Devas's German investors, awarding them compensation. India contested these arbitration awards in various jurisdictions, alleging fraud and corruption in the original Devas-Antrix agreement.[56] Despite these challenges, Devas and its investors sought to enforce the awards internationally, including efforts to seize Indian state assets abroad to recover the awarded sums. In January 2021, the Indian government initiated proceedings to liquidate Devas Multimedia, accusing the company of fraudulently securing the original agreement with Antrix. In January 2022, the Supreme Court of India upheld the government's decision to wind up Devas, effectively blocking enforcement efforts within India.[57] This goes to show that arbitration proceedings in relation to space activities are actually happening right now and are quite detailed, and the financial stakes are high.

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[53] Permanent Court of Arbitration, PCA Case No. 2022-34, Claimant's Statement of Claim, 8.

[54] Permanent Court of Arbitration, PCA Case No. 2022-34, Claimant's Statement of Claim, 2.

[55] Permanent Court of Arbitration, PCA Case No. 2022-34, Claimant's Statement of Claim, 1.

[56] Permanent Court of Arbitration, PCA Case No. 2022-34, Claimant's Statement of Claim, 122.

[57] Krishnadas Rajagopal, "Supreme Court Upholds Tribunal Decision to Wind Up Devas," accessed 2 September 2024, https://www.thehindu.com/news/national/supreme-court-upholds-tribunal-decision-to-wind-up-devas/article38281536.ece.

b. Space Mining

A second big field is the area of disputes relating to space mining, although not really practiced yet. In 2020, NASA revealed plans to begin lunar mining in collaboration with private companies as part of the Artemis program. Both China and India also have lunar programs with potentially comparable capabilities.[58] Disputes may arise in this field over mining rights, contracts, and environmental harms. As mentioned before, the OST prohibits any national appropriation. NASA's Artemis Accords, which are non-binding statements, addressing resource extraction and space resource utilization in Section 10. They clarify that these activities must adhere to the OST but emphasize that resource extraction does not automatically equate to national appropriation. They also aim to create safety zones in Article 11, with a view to enabling resource extraction to be carried out without interference by others. Those accords may have their legal failure itself, but at least they try to access the topic. On the other hand, some national laws have recognized the ability to extract celestial resources, such as the National Space Act of the USA mentioned above. However, disputes may arise if private companies take on this mission, whereas under the current legal framework, those parties have to seek national support under the LC. Contractual disputes risks may also arise from the uncertainty of the regulatory landscape, and face their own specific problems, given to the uncertain distances and process involved in the mining itself.

At the international level, States already have obligations to prevent harmful contamination both in space and on Earth, as outlined in the OST and MT. The increasing dispute resolution aimed at attributing liability for climate- related damages caused by terrestrial activities highlights the types of claims we might encounter concerning harmful activities in space that could negatively affect third parties. The distinctive nature of space-based resource extraction may present even greater challenges in determining liability compared to those encountered in climate-related claims. It could be particularly challenging for claimants to prove specific harm if the damage occurs in the space environment rather than on Earth.

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[58] Julia Dreosti et al., *Satellites and Space: Using Arbitration to Resolve Disputes in the New Frontier* (London: Clifford Chance LLP, 2023), accessed 26 August 2024, https://www.cliffordchance.com/content/dam/cliffordchance/briefings/2023/06/satellites-and-space-using-arbitration-to-resolve-disputes-in-the-new-frontier.pdf.

c. Space tourism

One of the more emerging fields, next to space mining, is the practice of space tourism, where it's evident that disputes arise as well. So far, usually the tourists sign a contract with the operator. In most cases, this is one company with a certain jurisdiction. This normally leads to claims being brought to a national court. However, the problem of jurisdiction can get more and more complex if there are multiple companies working together to bring this experience to their customers. If multiple jurisdictions and countries are involved, for example two companies work jointly together, and launch from a third state, the determination of the legal framework when it comes to damages can be complex. Different countries may have varying regulations and standards for space tourism. Harmonizing these regulations and ensuring compliance can be a challenge for arbitration processes. The current framework of arbitration may have to adapt because of this as well, as discussed below. Contractual disputes in space tourism are often intricate due to the detailed nature of agreements involved. Contracts between space tourism companies and their clients typically cover extensive clauses related to safety, services, and liability. Disagreements over these terms can be complex, necessitating arbitration to interpret and enforce contractual obligations. Moreover, disputes may arise between commercial entities and individual consumers, requiring arbitration to address consumer protection issues in a way that balances the interests of both parties. Environmental and ethical concerns also present challenges. Space tourism can impact the space environment and contribute to space debris, leading to disputes over environmental damage and liability. Arbitration may struggle with these novel issues, which lack established legal precedents. Ethical concerns regarding the commercialization of space and its effects on scientific exploration or cultural values can further complicate the arbitration process, requiring sensitive and balanced decision-making. Procedural challenges also play a role. The logistics of conducting arbitration proceedings involving space tourism parties may require innovative approaches, such as remote hearings and evidence presentation. These procedural issues can add complexity to the arbitration process, potentially impacting its efficiency and effectiveness.

2. The current state of space arbitration practice

The current state of space arbitration practice remains underdeveloped despite the growing need for effective dispute resolution mechanisms. While existing frameworks like the PCA's Optional Rules for Arbitration of Disputes Relating to Outer Space Activities

provide a starting point, they have not been widely tested. Additionally, there is an ongoing debate about whether the current arbitration mechanisms are sufficient to handle the complexities of space disputes, especially as private entities become more involved in space activities. The development of more specialized institutions or rules tailored specifically for space disputes may be necessary to address these gaps effectively.

a. The Space Treaties

When it comes to arbitration and liability, Articles VI and VII of the OST establish that states are internationally responsible for the activities of their governmental and non-governmental entities in outer space. They also require that non-governmental entities operating in outer space must be authorized and continuously supervised by their respective states. These states are held liable for any damage caused to another contracting state, or its natural or juridical persons, by an object they have launched into outer space. However, the OST does not address what would happen if such liabilities were invoked, and as shown before, private entities are not permitted to bring a claim against a liable government directly.

Since this problem is only implied in the OST, we have to look into the LC, which deepens the topic of Article VI and VII. Article XIV of the LC states, that if no settlement of a claim has arrived through diplomatic negotiations as provided for in Article IX, within one year from the date on which the claimant state notifies the launching state that it has submitted the documentation of its claim, the parties concerned shall establish a claims commission at the request of either party. In reality, however, this process could be very lengthy and difficult to realize. For instance, there are no provisions for default appointments, meaning that if a party fails to nominate a commission member, the claims commission would consist of just one member. This creates the risk that a dispute of significant national and international importance could be decided by a single individual, merely due to a missed deadline. Additionally, there are no modern-day standards ensuring the independence and impartiality of the adjudicators.[59] Article XI states that a state shall not, however, be entitled to present a claim under this Convention in respect of the same damage for which a claim is being pursued in the courts or administrative tribunals or agencies of a launching state or under another

[59] Rachael O'Grady, "Star Wars: The Launch of Extranational Arbitration?," *CIArb Arbitration Journal* 82, no. 4 (2016): 3.

international agreement which is binding on the states concerned. This means the claim cannot be made in national courts and before the commission twice. The process is not binding unless the parties explicitly agree to make it so, and even if they do, the enforceability of a decision by the Claims Commission remains untested, see Article XIX.

b. Approaches of intergovernmental bodies

To address these shortcomings, both the United Nations Office for Outer Space Affairs and the UNCOPUOS held a conference on those topics back in 1996 and suggested that a special chamber should be implemented in the ICC to deal with space-related activities. This means, that the problem of missing dispute resolution methods has been known for almost 30 years now. It is therefore not surprising, that there are multiple attempts today to address this.

Intergovernmental bodies, meaning entities created by a treaty or other formal agreement between two or more sovereign states, such as the International Telecommunications Satellite Organization (ITSO), adopted arbitration in its constitutional agreement.[60] This is especially helpful since the ITSO is not a state and can, therefore, not rely on the LC without any problems. Arbitration is to be conducted in accordance with Annex A of the ITSO Agreement, which sets out various procedural rules. The European Telecommunications Satellite Organization (EUTELSAT) also stipulates mandatory arbitration for its member states.[61] The ESA Convention also provides for optional arbitration in case of a dispute,[62] similar to the Constitution of the ITU.[63] Additionally, bilateral and multilateral agreements between states often include arbitration clauses, such as the International Space Station Intergovernmental Agreement.[64] By analyzing those multilateral agreements, it is observable that arbitration clauses are already common in the space industry. Furthermore, there are numerous commercial contracts between industry operators that contain arbitration clauses, some of which have already been utilized.[65]

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[60] Agreement Relating to the International Telecommunications Satellite Organization, Article XVI, 1971.

[61] *EUTELSAT Amended Convention*, Annex B, European Telecommunications Satellite Organization, 2002.

[62] Convention for the Establishment of a European Space Research Organisation, Article XVII, European Space Agency, 1962.

[63] *Constitution of the International Telecommunications Union (ITU)*, Art. 56, International Telecommunication Union, 1992.

[64] Space Station Agreement Between the United States of America and Other Governments, Art. 23.

[65] Rachael O'Grady, "Star Wars: The Launch of Extranational Arbitration?," 5.

c. Permanent Court of Arbitration

The PCA and its Optional Rules for Arbitration of Disputes Relating to Outer Space Activities (PCA Outer Space Rules) are a little bit more public, and therefore more compliant with the space treaties. These rules are based on the UNCITRAL Rules[66] with specifications for space disputes. The PCA Outer Space Rules already apply whenever two or more parties agree to use them for any disputes arising between them "in respect of a defined legal relationship", Article 1 PCA Outer Space Rules. The same article clarifies that "the characterization of a dispute as relating to outer space is not necessary for the jurisdiction where parties have agreed to settle a dispute under these rules." This would solve the potentially problematic uncertainty over what constitutes a dispute related to outer space, making jurisdiction dependent solely on the parties' agreement and not on the place of action or failure. The rules also explicitly state that by adopting them, parties automatically waive any sovereign or other immunity that might otherwise apply, Article 1 Section 2 PCA Outer Space Rules. This opens the gates that not only states but also the intergovernmental organizations operating in space have access to arbitration, and cannot claim that there are problems with jurisdiction.

The rules also include specific requirements for the notice of arbitration. Claimants are required to identify "any rule, decision, agreement, contract, convention, treaty, constituent instrument of an organization or agency, or relationship" that has given rise to the dispute, Article 3 Section 3 PCA Outer Space Rules. By choosing a rather unspecific language in said article, it is tried to make sure that they can be applied to a variety of cases. Additionally, the rules oblige the Secretary General of the PCA to maintain optional lists of arbitrators and experts in this field, Article 10 Section 4 and Article 29 Section 7 PCA Outer Space Rules. These lists are intended to assist the parties in appointing a tribunal and to provide support for both the parties and the tribunal in selecting any necessary experts. The rules also offer additional features designed to address the unique challenges of space-related arbitration, such as the possibility to request a "non-technical document" from the parties to help them understand "scientific, technical or other specialized information", Article 27 Section 4 PCA Outer Space Rules. Additionally, a "confidentiality advisor" may be appointed to assist the tribunal in determining whether certain documents, which may be so technically complex

[66] Fausto Pocar, "An Introduction to the PCA's Optional Rules for Arbitration of Disputes Relating to Outer Space Activities," *Journal of Space Law* 38 (2012): 171.

that they have little relevance to a layperson, should be treated as confidential, Article 17 Section 8 PCA Outer Space Rules.

Another arbitral institution worth mentioning is the ICC and its rules of arbitration, which could be applied to space-related issues as well. In particular, the ICC rules are well-suited for disputes arising from commercial agreements in the space industry, such as satellite launches, procurement contracts, or joint ventures. In these scenarios, parties can agree to resolve their disputes under the ICC Rules, ensuring a neutral, reliable, and enforceable arbitration process. Additionally, the ICC Rules offer flexibility, allowing parties to adapt the proceedings to the specific needs of space law disputes. This flexibility includes selecting arbitrators with expertise in space law, incorporating confidentiality provisions to protect sensitive information, and utilizing specialized procedural rules when necessary. The choice of rules also depends on the types of parties involved. The PCA is particularly well-suited for disputes involving states, intergovernmental organizations, or state entities, given its historical focus on public international law and its ability to address disputes involving public international law principles, such as those found in space treaties. This framework is ideal when disputes involve state responsibility, liability under international treaties (such as the OST or the LC), or issues concerning the regulation of space activities. On the other hand, the ICC is often more suitable for private commercial disputes or those involving private companies and non-governmental organizations. The ICC Arbitration Rules provide a neutral forum for private parties and are designed to handle disputes efficiently, with a strong focus on confidentiality, enforceability, and commercial realities. This makes the ICC a better choice for private entities engaged in space-related activities, such as satellite operators, launch service providers, or manufacturers. Awards rendered under ICC arbitration are generally more widely recognized and enforceable under the New York Convention, which has over 160 signatory states. This makes ICC arbitration particularly attractive for disputes involving private parties or cross-bordercommercial transactions where enforceability across multiple jurisdictions is critical. While PCA awards can also be enforceable under the New York Convention, the PCA's focus on disputes involving public international law may sometimes lead to challenges in enforceability, especially when state immunity or other public policy considerations are at play. The choice between the ICC Rules of Arbitration and the PCA Optional Rules for Arbitration of Disputes Relating to Outer Space Activities depends largely on the specific circumstances of the dispute.

In 2021, the Dubai International Finance Centre (DIFC) launched its "Courts of Space" as part of its Courts of the Future initiative. This initiative aims to establish a judicial network to meet modern space exploration's commercial demands and encourage businesses to use DIFC Courts for resolving space-related disputes. As part of this effort, the DIFC has released two editions of a "Space Dispute Guide"[67], detailing court procedures and jurisdictional frameworks for handling various types of space disputes.

D. Approaches for the future

Arbitration has proven to be an effective method for resolving disputes and is often regarded as the most promising approach for space-related conflicts. However, it is crucial to remember that arbitration is a voluntary process requiring parties to agree to it, usually through an agreement, treaty, or a special "compromise." Given that there have been very few publicly known disputes arising from space activities over the last few years, it is reasonable to question whether there is a need to further establish arbitration specifically for space disputes. Additionally, because arbitration is a predominantly confidential process, the extent of its current use in space disputes remains somewhat unclear. However, some scholars argue that the current arbitration system for space disputes is not sufficient, even with the PCA Outer Space rules.[68] The following will be a short overview of alternative regulations and the question of whether there is a need to develop a legal framework.

a. International space arbitration organization

One option would be the establishment of an own organization for the disputes arising from space arbitration. This would have, of course, the advantage that this is a specialized body with extensive knowledge in one field. The growing involvement of private companies in space activities necessitates a dispute resolution mechanism that is reliable and fair. An international space arbitration organization could assure private entities that their rights and investments will be protected under a well-defined legal

[67] DIFC Courts, *Space Disputes Guide*, 2nd ed. (Dubai: Dubai International Financial Centre Courts, 2024), accessed 3 September 2024, https://www.difccourts.ae/media-centre/publications/space-disputes-guide/space-disputes-guide-edition-2.

[68] See for example Geraldine Goh, *Dispute Settlement in International Space Law* (Alphen aan den Rijn: Kluwer Law International, 2007), 139 ff.

framework. Again, space law disputes may fall under different jurisdictions or legal frameworks, leading to inconsistent rulings and uncertainty. An international space arbitration organization could provide a unified legal forum with standardized procedures, leading to more predictable and consistent outcomes. This uniformity could reduce risks for companies and encourage investment in space activities. On the other hand, even with an international space arbitration organization, enforcing arbitration awards could be difficult. Space law involves sovereign states and private entities across various jurisdictions. If a country refuses to recognize or enforce an arbitration award, the effectiveness of such an organization would be limited. This issue exists in current international arbitration practices but might be exacerbated in the context of space disputes.

There have been attempts to establish something similar. In 1996, a colloquium was held focusing on "Increasing the Effectiveness of the International Court of Justice (ICJ)."[69] Among the topics discussed was the court's potential role in handling disputes in the evolving field of international space law. Suggestions during this colloquium included establishing a special chamber within the ICJ to handle space law disputes, similar to existing chambers for environmental law, as discussed below.[70] The discussion considered whether such a chamber could implement fast-track procedures and provide standing for international organizations.

Later, at the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space Technical Forum in Vienna in 1999, the need for a new dispute resolution framework for space commercialization was highlighted.[71] The forum emphasized three key points: the current space treaties do not adequately address dispute settlement for the evolving scope of space activities, they mainly focus on inter-state disputes, and there is a need for mechanisms suitable for space activities, particularly involving non-state actors. This led to ongoing discussions about creating a specialized dispute resolution mechanism to handle the complex nature of space law.

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[69] Conny Peck and Roy S. Lee, eds., *Increasing the Effectiveness of the International Court of Justice: Proceedings of the ICJ/UNITAR Colloquium to Celebrate the 50th Anniversary of the Court* (The Hague: Martinus Nijhoff Publishers, 1997).

[70] Geraldine Goh, *Dispute Settlement in International Space Law*, 63 f.

[71] United Nations, Proceedings of the Workshop on Space Law in the Twenty-First Century, UNISPACE Technical Forum, July 1999, 193.

b. ICJ

Another proposal that was already discussed in 1996 is the involvement the ICJ in the process. Specifically, some have suggested establishing a dedicated chamber within the ICJ for outer-space disputes, similar to the environmental chamber created in 1993.[72] The primary advantage of such a chamber would be its ability to handle cases with specialized knowledge while retaining the option to refer cases to the full court if necessary. However, the environmental chamber of the ICJ has not yet proven successful, having not published a single case.[73] One key reason for this is the lack of a universally accepted body of environmental law under which disputes could be brought. While space law is more agreed upon on a level of what happens in space, the specific process of arbitration in front of the ICJ may be cumbersome due to a specific lack of uniformity at the international or cooperative level, which could reduce the willingness of parties to use this chamber to resolve disputes. Given the current absence of broadly recognized international agreements to facilitate the resolution of space-related disputes, the viability of an ICJ space chamber remains uncertain.[74] For these reasons, the idea of using the ICJ may not be the preferred option.

c. Multi-Door Courthouse System

The "multi-door courthouse" (MDC) approach is a concept designed to offer multiple avenues for dispute resolution, beyond the traditional court litigation system. The application of this model to space law remains largely theoretical at this point, with scholars exploring its potential as part of the broader conversation on how to develop effective dispute resolution frameworks for the increasingly commercialized and complex domain of outer space.[75] The origin of this approach can be traced back to Prof. Frank Sander, who had the theory, that instead of a single dispute resolution forum, a settlement center or multi-door courthouse would direct parties to the most suitable mechanism for their case, which could include mediation, arbitration, fact-finding,

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[72] George Khoukaz, "ADR That Is Out of This World: A Regime for the Resolution of Outer-Space Disputes," *Journal of Dispute Resolution* 2018, no. 1 (2018): 274.

[73] Lotta Viikari, "Towards More Effective Settlement of Disputes in the Space Sector," *Lapland Law Review* 1, no. 1 (2011): 241.

[74] George Khoukaz, "ADR That Is Out of This World: A Regime for the Resolution of Outer-Space Disputes," 275.

[75] See for that especially Geraldine Goh, *Dispute Settlement in International Space Law*, 243 f.

malpractice review panels, superior courts, or an ombudsman.[76] Sander envisioned a single, large courthouse with multiple "doors" for dispute resolution, where each case would be assessed and directed to the most suitable process. These processes could include conciliation, mediation, arbitration, or social services.[77] An MDC's screening and referral process is designed to identify the nature and specifics of the dispute, allowing it to be channeled to the most appropriate dispute resolution mechanism. This system aims to reduce court caseloads, expedite the resolution process, and provide a more accessible and effective means of resolving disputes.

The process begins with an initial case assessment, where the nature of the dispute and the parties' needs are evaluated. This assessment helps determine the most appropriate dispute resolution method. For example, complex disputes involving technical issues may be better suited to arbitration, while parties willing to negotiate might benefit more from mediation.[78] Once the appropriate method is identified, the case is referred to that process within the MDC.[79] Mediation involves a neutral mediator who facilitates discussions between the parties to help them reach a mutually acceptable agreement. In contrast, arbitration involves an arbitrator or a panel of arbitrators who make a binding decision based on the evidence and arguments presented. The system may also include other specialized processes, such as expert determination for technical disputes or negotiation sessions for less formal resolutions. Following the dispute resolution process, the MDC ensures that the outcomes are implemented and monitored. This may involve enforcing agreements, addressing any remaining issues, and providing support to ensure compliance.[80]

The MDC approach could be suitable for arbitration purposes, because the international legal system relies not only on substantive laws but also on procedural rules. This need is amplified in international law, which lacks of legislative and executive branches, unlike national law. Therefore, there is a risk of gasps in international law that

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[76] Frank E. A. Sander, "National Conference on the Causes of Popular Dissatisfaction with Administration of Justice," *Federal Rules Decisions* 70 (1976): 79.

[77] Geraldine Goh, *Dispute Settlement in International Space Law*, 267.

[78] Ibid., 275.

[79] Gladys Kessler and Linda J. Finkelstein, "The Evolution of a Multi-Door Courthouse," *Catholic University Law Review* 37, no. 3 (1988): 589 f.

[80] Sarah Cole, *Craig McEwen, and Nancy Rogers, Mediation: Law, Policy, Practice* (New York: Aspen Publishers, 2001), chap. 6, para. 15.

needs to be closed. Traditional dispute resolution methods—such as negotiation, mediation, and arbitration—need to be re-evaluated to address the complexities of modern international space law, especially via the multi-door courthouse model. This model offers a flexible approach to dispute resolution by providing multiple avenues for addressing conflicts.[81] In addition, the system enhances efficiency by integrating both mediatory and adjudicatory models. This dual approach aims to speed up the resolution process while improving the overall quality of the outcomes. By offering various methods, the MDC can effectively address different types of disputes and meet the needs of all parties involved. Moreover, the system includes a crucial connection between dispute resolution and enforcement mechanisms.[82] This integration ensures that rules are clarified and implemented effectively. In the context of space law, where international cooperation and transnational issues are prominent, the MDC could significantly improve dispute management. It addresses traditional concerns about sovereignty by offering a structured, multi-faceted approach that balances mediation and adjudication, thus fostering a more organized and coherent system for maintaining peace and security in outer space.

E. Summary

As space activities transition from state-sponsored missions to commercial operations, disputes related to space activities are becoming more common and increasingly complex. This article highlighted the growing need for arbitration as an effective mechanism for resolving space-related conflicts, particularly in key areas such as satellite operations, space mining, and space tourism. The discussion outlined how disputes in these fields arise and the unique challenges they pose to existing arbitration frameworks. Moreover, it explores current international treaties' limitations and specialized arbitration bodies' potential role.

Not only can one expect a rise in arbitration claims related to space activities in the future, but such disputes are already taking place. These disputes will be diverse, varying in both subject matter and the resources involved. Private space activities now encompass a much wider range of operations compared to state-sponsored missions,

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[81] Karl-Heinz Böckstiegel, "Streitbeilegung bei der kommerziellen Nutzung des Weltraums," in *Festschrift für Ottoarndt Glossner zum 70. Geburtstag*, eds. K.-H. Böckstiegel et al. (Cologne: Carl Heymanns Verlag, 1994), 39.

[82] Geraldine Goh, *Dispute Settlement in International Space Law*, 296.

leading to more intricate legal implications. Today, private space ventures include everything from asteroid mining to sending private citizens on space tourism flights, further complicating the legal landscape. The main challenge in resolving such disputes is that private entities are often bound by a legal framework originally designed for public entities. Although some organizations, such as ESA, have developed their own dispute settlement mechanisms, a detailed analysis of these is beyond the scope of this discussion. However, the question of whether there is an actual need for the development of a unified legal framework specifically tailored to address the complexities of space disputes cannot be answered with certainty. As it was shown, there are already instruments and frameworks in place that are, at least in theory, well-equipped to handle space-related cases. Of course, when they are combined or implemented, the effectiveness may be increased. It needs to be remembered, that arbitration remains a voluntary act. It is in the interest of all relevant space actors to minimize their own financial and legal risk by, for example, clarifying these matters beforehand. By relying on, for example, the PCA Optional rules, the disputes may be already prepared for before they arise. It remains to be seen if, over time, the existing rules are sufficient to cover space arbitration or if it becomes clear that this system needs to be reconsidered.