The Analytical Study of Dispute Resolution Methods in Space Regulations

Abdullah Abdullatif [a,*], Jamal Barafi [b], Sheer Abbas [b]

[a] Aberystwyth University, United Kingdom.
[b] University of Sharjah, United Arab Emirates.

*Corresponding Author: abd.latif94@hotmail.com

ARTICLE INFO

Article history
Received: June 20, 2023
Revised: December 15, 2024
Accepted: December 15, 2024

Keywords
Dubai's Court;
Liability Convention;
Outer Space Treaty;
Space Law Dispute;

ABSTRACT

The space sector has emerged as a lucrative market for both states and private entities, driven by unprecedented technological advancements. Private actors have become significant players in this field; however, their role is not adequately reflected in the existing legal frameworks for resolving disputes under international space law, which remain state-centric. This research addresses the gap by examining the procedures for resolving space-related disputes involving states and private entities. Using descriptive, analytical, and comparative methodologies, the study explores national and international conflict resolution mechanisms in space law. It reviews key agreements and initiatives such as the Outer Space Treaty, the Liability Convention, and Dubai's Court of Space. The research highlights the advantages and limitations of various dispute resolution methods, including those offered by international law and arbitration forums, with a focus on Dubai's Court of Space as a new and innovative platform. The study concludes that the rapid expansion of the space sector necessitates the development of inclusive and effective mechanisms for resolving disputes. Current frameworks are inadequate for addressing the complexities of modern space activities, often excluding private entities. Dubai's Court of Space offers specialized expertise, transparency, and the ability to set global precedents, making it a promising solution for future disputes.

1. Introduction

International space law consists of five international treaties adopted in the 1960s and 1970s, and several non-binding principles and resolutions adopted by the United Nations General Assembly to regulate specific aspects of space activities, however, these treaties contain few principles for settling space disputes.[1] It is expected that many legal disputes will arise in outer space in the future as a result of the great technological development and privatization of space activities, the emergence of international cooperative projects, and the emergence of new

[1] Scott Pace, 'U.S. Space Policy and Theories of International Relations: The Case for Analytical Eclecticism', *Space Policy*, 65 (2023), 101538 https://doi.org/10.1016/j.spacepol.2022.101538

types of space activities that did not exist at the time of the issuance of the five space treaties, such as space tourism and the exploitation of space resources.[2]

The existence of a generally accepted system for settling disputes on matters of space law will not only benefit the international community by reducing tension in international relations, but it also appears to be indispensable for increasing the reliability and credibility of this new field of international law, and also for the increase and development of space activities and the increase of actors in the space field. The adequacy of space activity dispute resolution mechanisms is an issue that has long been debated. Reynolds argues that the increase in activity in outer space will require more extensive laws and regulations to deal with damages and liability in space.[3]

The wide range of actors in outer space is one reason why it is difficult to find a unified system for resolving space disputes. The huge sums invested in outer space and the technological development in the field of space make human activity in outer space develop at unprecedented rates, and the regular system of litigation cannot keep up with it. Although it does not appear to be a specific method specifically designed for space law disputes, dispute settlement mechanisms are by no means limited in number, with some arguing that more than 57 treaties are providing non-binding dispute settlement mechanisms that could be applied. Some argue that as space activities evolve, and new space activities emerge, new space dispute settlement mechanisms are necessary to deal with the controversial issues these activities raise.[4]

The main problem appears to be the absence of a specialized dispute settlement mechanism with enforcement powers. This paper will analyse the international legal framework for settling disputes related to space activities, and assess the adequacy and appropriateness of these means in reaching a final settlement of various types of space disputes.[5] This paper begins by reviewing existing international laws on dispute settlement, including the Outer Space Treaty, the Liability Convention, and the Draft Convention on the Settlement of Space Law Disputes, then discusses the Optional Rules for Arbitration of Disputes Relating to Outer Space Activities, and whether these rules are adequately equipped to settle

[2] Xiaodao Li, 'Comparing the Power Resources Critical to International Rulemaking in Outer Space: China and the United States', *Advances in Space Research*, 72.6 (2023), 2297–2312 https://doi.org/10.1016/j.asr.2023.05.038

[3] Mariel Borowitz, Althea Noonan, and Reem El Ghazal, 'U.S. Strategic Interest in the Moon: An Assessment of Economic, National Security, and Geopolitical Drivers', *Space Policy*, 69 (2024), 101548 https://doi.org/10.1016/j.spacepol.2023.101548

[4] Tanya Zerbian and others, 'Territorialising Knowledge-Policy Interfaces: Lessons from Urban Food Governance Spaces', *Environmental Science & Policy*, 161 (2024), 103883 https://doi.org/10.1016/j.envsci.2024.103883

[5] Anish Dey and Jithin Jagadanandan, 'Unveiling the Realm of AI Governance in Outer Space and Its Importance in National Space Policy', *Acta Astronautica*, 228 (2025), 253–64 https://doi.org/10.1016/j.actaastro.2024.11.022

space disputes. The final section of the paper discusses Dubai's Court of Space, as the latest proposal for space dispute settlement, and aims to provide a schematic overview of its rules, highlighting their advantages and disadvantages, and encouraging their use.

2. Research Method

This research uses a factual, analytical, and comparative approach to examine the legal framework for resolving space law disputes at international and national levels. The descriptive approach summarizes the basic concepts and principles of resolving such disputes, including determining resolution mechanisms.[6] It provides a comprehensive framework for understanding Space Law Dispute Resolution Mechanisms across various legal systems. The analytical approach examines provisions of international conventions and treaties, such as the Outer Space Treaty and the Liability Convention, alongside instruments like the Optional Rules of the PCA and Dubai's Court of Space. This analysis identifies gaps, ambiguities, and areas for improvement in the current legal framework. A comparative approach determines international treaties and rules by comparing their efficiency and comprehensiveness, highlighting best practices and shortcomings.[7] The study utilizes a mix of primary and secondary sources to ensure a thorough analysis. Primary sources include international legal instruments like the Outer Space Treaty, the Liability Convention, and the Optional Rules of the PCA, as well as relevant case law and judgments to offer practical insights. Secondary sources, such as scholarly articles, books, and official reports, enrich the understanding of Space Law Dispute Resolution Mechanisms, providing both theoretical and practical perspectives while offering suggestions to enhance national and international legal systems. Data is gathered qualitatively to consolidate opinions and portray the inferences that apply to the title and discussion.[8]

3. Results and Discussion

The Outer Space Treaty and The Moon Agreement

Despite the steady boom of commercial activities in space, the Outer Space Treaty, as a cornerstone of international space law, must be equipped with

[6] Kaigeng Li, Hong Wu, and Yupeng Dong, 'Copyright Protection during the Training Stage of Generative AI: Industry-Oriented U.S. Law, Rights-Oriented EU Law, and Fair Remuneration Rights for Generative AI Training under the UN's International Governance Regime for AI', *Computer Law & Security Review*, 55 (2024), 106056 https://doi.org/10.1016/j.clsr.2024.106056

[7] Abdul Kadir Jaelani and others, 'Artificial Intelligence Policy in Promoting Indonesian Tourism', *Volksgeist: Jurnal Ilmu Hukum Dan Konstitusi*, 2024, 109–37 https://doi.org/10.24090/volksgeist.v7i1.10623

[8] Qiuwen Wang, 'Maritime Law Enforcement Concerning Offshore Energy Platforms: Navigating International Law Constraints and Challenges', *Marine Policy*, 170 (2024), 106370 https://doi.org/10.1016/j.marpol.2024.106370

effective dispute settlement mechanisms.[9] The Outer Space Treaty goes no further than emphasizing international cooperation and consultation in the event of a dispute between the parties. Moreover, such consultations are a method of avoiding conflicts rather than resolving them.[10]

In principle, under Article III, the Outer Space Treaty refers the issue of dispute resolution indirectly to the traditional methods of settling international disputes under public international law and the United Nations Charter, such as negotiation, investigation, mediation, conciliation, arbitration, and others. The provision contained in Article III of the Outer Space Treaty has been replicated in numerous legal instruments relating to outer space, such as the Moon Agreement, the Remote Sensing Principles, the Principles of Direct Television Broadcasting, and the Principles of Use of Nuclear Power in Outer Space.[11]

Referring to the United Nations Charter, of the methods of resolving disputes proposed by Article 33 of the UN Charter, only two lead to a binding decision: arbitration and adjudication by the International Court of Justice. However, The United Nations Charter does not make either procedure mandatory.[12] It is worth noting that the International Court of Justice has never been asked to decide a space-related dispute. Also, States can always invoke sovereign immunity to prevent in advance the establishment of an arbitral tribunal or the commencement of proceedings before an international tribunal, and dispute settlement mechanisms available under public international law are usually designed for States only and not accessible to private entities.[13]

According to Sloup, the Outer Space Treaty must be equipped with the means to deal with space conflicts. Other researchers point out that the indirect reference to dispute settlement mechanisms included in the UN Charter does not amount to establishing a dispute settlement mechanism.[14] Therefore, some believe that invoking the principles of international law and referring to the United Nations Charter under Article III of the Outer Space Treaty does not obligate States to

---

[9] Huan Yu and Mingyan Nie, 'Acceding to the Moon Agreement to Acquire Legal Certainty: An Optional Solution for China in the New Era of Lunar Exploration and Exploitation', *Acta Astronautica*, 212 (2023), 665–71 https://doi.org/10.1016/j.actaastro.2023.08.035

[10] Clive R. Neal and others, 'The Moon Needs an International Lunar Resource Prospecting Campaign', *Acta Astronautica*, 214 (2024), 737–47 https://doi.org/10.1016/j.actaastro.2023.11.017

[11] Martin Svec, 'Outer Space, an Area Recognised as Res Communis Omnium: Limits of National Space Mining Law', *Space Policy*, 60 (2022), 101473 https://doi.org/10.1016/j.spacepol.2021.101473

[12] Du Li, 'Cyber-Attacks on Space Activities: Revisiting the Responsibility Regime of Article VI of the Outer Space Treaty', *Space Policy*, 63 (2023), 101522 https://doi.org/10.1016/j.spacepol.2022.101522

[13] Lucas Mallowan, Lucien Rapp, and Maria Topka, 'Reinventing Treaty Compliant "'Safety Zones'" in the Context of Space Sustainability', *Journal of Space Safety Engineering*, 8.2 (2021), 155–66 https://doi.org/10.1016/j.jsse.2021.05.001

[14] Joseph N. Pelton, 'Creation of a Comprehensive Global Space Risk Scale (SRS)', *Journal of Space Safety Engineering*, 5.1 (2018), 77–81 https://doi.org/10.1016/j.jsse.2017.11.005

resolve their disputes through dispute settlement mechanisms.[15] Other researchers believe the Outer Space Treaty has a primitive and inappropriate dispute settlement system due to its lack of implementation mechanisms. Therefore, the Outer Space Treaty recognizes the peaceful settlement of disputes under public international law as an integral part of outer space law. However, it does not create a specialized and binding system for settling space disputes, thus preserving the cooperative nature of space exploration and use.[16]

The dispute settlement mechanism under the OST is very similar to that under the International Space Station Agreement in that parties should primarily settle disputes through consultations between relevant space agencies or at the level of government.[17] Suppose consultations do not succeed in resolving disputes. In that case, the dispute can be submitted to any form of dispute resolution agreed upon by the parties, such as mediation or arbitration, meaning that a binding dispute settlement cannot be reached unless the parties agree. Thus, the Space Station Agreement, similar to the OST, does not provide a binding dispute settlement mechanism.[18] The Moon Agreement provides more detailed procedures for the peaceful settlement of disputes. A State Party that has reason to believe that another State Party is not fulfilling the obligations imposed on it or that another State Party is interfering with the rights enjoyed by the first State may request consultations with that State Party. A State Party receiving such a request must enter into consultations without delay, and if consultations fail, state parties must seek a diplomatic solution to the dispute.[19]

Each State Party must seek a mutually acceptable solution to any dispute, considering the rights and interests of all States Parties. In the event of failure to reach a mutually agreed upon outcome through diplomatic channels, the States Parties are expected to take all measures to settle their disputes by other peaceful means of their choice appropriate to the circumstances and nature of the dispute. This means that the Moon Agreement only imposes the obligation to try to reach a

[15] Tommaso Sgobba, 'Assured Debris Removal: Proposal for an Operational and Regulatory Framework', *Journal of Space Safety Engineering*, 7.1 (2020), 1–2 https://doi.org/10.1016/j.jsse.2020.02.005

[16] Mirko Trisolini, Hugh G. Lewis, and Camilla Colombo, 'Constrained Optimisation of Preliminary Spacecraft Configurations under the Design-for-Demise Paradigm', *Journal of Space Safety Engineering*, 8.1 (2021), 63–74 https://doi.org/10.1016/j.jsse.2021.01.005

[17] Melissa de Zwart, Stacey Henderson, and Michelle Neumann, 'Space Resource Activities and the Evolution of International Space Law', *Acta Astronautica*, 211 (2023), 155–62 https://doi.org/10.1016/j.actaastro.2023.06.009

[18] Xiaodan Wu, 'The International Lunar Research Station: China's New Era of Space Cooperation and Its New Role in the Space Legal Order', *Space Policy*, 65 (2023), 101537 https://doi.org/10.1016/j.spacepol.2022.101537

[19] Mallowan, Rapp, and Topka.

peaceful settlement of disputes without obligating States Parties to make a binding settlement of their disputes.[20]

The Outer Space Treaty's shortcomings in settling space disputes are apparent. It does not establish clear and specific means for settling space disputes but instead provides for preventive measures consisting of international consultations. However, conducting these consultations is not obligatory for States, as States may even refuse to enter into international consultations regarding their space activities with other States without being considered to have violated the Outer Space Treaty, even if that may put them in a bad light before the international space community in general.[21]

The settlement of disputes refers to the general rules under general international law and the Charter of the United Nations. These rules, on the one hand, are specific only to states and persons of public law, and on the other hand, they are not equipped to deal with the exceptional nature of space activities. Not to mention that most are non-binding methods and only sometimes lead to a final and binding dispute settlement unless both parties agree.[22] The Moon Agreement does not provide much of an addition, as it provides the same procedures as the Outer Space Treaty and the only addition is that states are obligated to seek solutions to their space disputes. Of course, they are not obligated to reach a binding settlement to the conflict; they merely seek to do so. In any case, the Moon Agreement is considered a failure in international space law due to the reluctance of most States to ratify it. Other outer space conventions, except for the Liability Convention, still need to be made public on the issue of dispute settlement.[23]

The 1972 Liability Convention is a widely ratified United Nations treaty that addresses dispute settlement. It addresses international liability for damage caused by space objects and adopts a two-tier approach to attributing liability. According to the Liability Convention, all States launching a space object bear individual and joint liability for any damage resulting from that object. Regarding damage occurring on the Earth or to an aircraft in flight, absolute liability applies, meaning that the affected state is not required to prove the fault of the launching

[20] Peter Martinez and others, 'Reflections on the 50th Anniversary of the Outer Space Treaty, UNISPACE+50, and Prospects for the Future of Global Space Governance', *Space Policy*, 47 (2019), 28–33 https://doi.org/10.1016/j.spacepol.2018.05.003

[21] Hjalte Osborn Frandsen, 'Looking for the Rules-of-the-Road of Outer Space: A Search for Basic Traffic Rules in Treaties, Guidelines and Standards', *Journal of Space Safety Engineering*, 9.2 (2022), 231–38 https://doi.org/10.1016/j.jsse.2022.02.002

[22] Dimitra Atri, Paulina Umansky, and Katepalli R. Sreenivasan, 'Sustainability as a Core Principle of Space and Planetary Exploration', *Space Policy*, 70 (2024), 101636 https://doi.org/10.1016/j.spacepol.2024.101636

[23] Jose Garcia-del-Real and Manuel Alcaráz, 'Unlocking the Future of Space Resource Management through Satellite Remote Sensing and AI Integration', *Resources Policy*, 91 (2024), 104947 https://doi.org/10.1016/j.resourpol.2024.104947

state.[24] In outer space, the fault liability applies for damages occurring somewhere other than the surface of the Earth. This means that liability can only be attributed if the damage results from the fault of the launching State.[25] Absolute liability arises about damage caused by space objects on the surface of the Earth or to an aircraft in flight, and the launching State is obligated to pay full compensation to the affected State without the latter needing to provide any evidence proving the fault of the launching State. However, the launching State can be exempt from liability if it is proven that the damage resulted from either gross negligence or omission of the affected State. However, the exemption does not apply if the launching State's activities were incompatible with international law.[26]

The concept of absolute liability has no counterpart in other areas of international law, and taking into account the dangerous nature of space activities, it provides a greater level of protection to the affected State than the Outer Space Treaty. In addition, by removing the requirement to prove the fault of the launching State and the assumption of absolute responsibility, the concept of absolute liability departs from the well-established principle of international law, according to which a state's obligation under international law arises only if a wrongful act can be attributed to it.[27] The Liability Convention allows States to assert liability claims on their behalf or behalf of their persons and entities. Claims must be presented to the launching State through diplomatic channels within one year from the date of the damage or from the date on which the affected State became aware of the damage.[28] States must attempt to settle within one year from the date the claim is presented. If the dispute is not resolved within that period, the parties may, upon request, establish a Claims Commission. The Claims Commission shall consist of three members. Each party chooses a member, and the third member, the chairman, is chosen jointly by the two parties.[29]

The Claims Commission issues its decision, by a majority vote, within one year on the case and the amount of compensation. The Commission's decision is final and binding only if the parties agree to it; otherwise, it is merely a

[24] Mini Gupta and Tommaso Sgobba, 'Convention on the Regulation of Near Space', *Journal of Space Safety Engineering*, 9.2 (2022), 129–31 https://doi.org/10.1016/j.jsse.2022.05.004
[25] Ryan Frodge and Daniel Murray, 'Space Data Integration', *Journal of Space Safety Engineering*, 9.2 (2022), 182–88 https://doi.org/10.1016/j.jsse.2022.02.015
[26] Nevan Simone, Brian C. Weeden, and Moriba K. Jah, 'Introducing the Satellite Dashboard: A Tool for Enhancing the Visibility of Rendezvous and Proximity Operations in Geosynchronous Orbit', *Journal of Space Safety Engineering*, 9.2 (2022), 251–56 https://doi.org/10.1016/j.jsse.2022.01.002
[27] Guoyu Wang and Xinyi Huang, 'On the Common Heritage of Mankind Principle in Space', *Acta Astronautica*, 211 (2023), 926–38 https://doi.org/10.1016/j.actaastro.2023.07.002
[28] Thomas Graham, Kathiravan Thangavel, and Anne-Sophie Martin, 'Navigating AI-Lien Terrain: Legal Liability for Artificial Intelligence in Outer Space', *Acta Astronautica*, 217 (2024), 197–207 https://doi.org/10.1016/j.actaastro.2024.01.039
[29] Zia MADANI, 'Unpacking Inclusivity of the Antarctic Treaty System amidst Contemporary Challenges', *Polar Science*, 2024, 101144 https://doi.org/10.1016/j.polar.2024.101144

recommendatory award. Regarding applicable law, the Liability Convention provides that compensation shall be determined by international law and the principles of justice and equity to restore the affected party to the condition that would have existed had the damage not occurred.[30] It is worth noting that the Liability Convention explicitly allows legal measures to be taken against the launching State or its entities before the local judiciary in that State. However, the procedures followed in the Liability Convention cannot be invoked before the local judiciary, such as the necessity of issuing a decision within a year. The affected State must choose between domestic judicial procedures or the Liability Convention procedures, and it is not expected, and very rare, that the domestic judiciary will be able to issue a decision on disputes related to space activities within just one year.[31]

Despite its importance, the dispute settlement mechanism provided in the Liability Convention has many shortcomings, as its non-binding nature has often been criticized. Its approach to dispute settlement has been portrayed as mere conciliation. Some believe that the Claims Commission may be described as an ad hoc tribunal, and it has also been described as a semi-arbitration court.[32] First, non-governmental entities cannot effectively and directly benefit from the dispute resolution mechanism provided by the Liability Convention, as they do not have an independent right to pursue their claims. They can only do so if their State accepts to do so on their behalf, and States, of course, are not obligated to accept their request, and the Claims Commission can only be formed if one of the parties requests it. Also, international governmental organizations cannot present claims to the Claims Commission; instead, they rely on the cooperation of states to confirm their claims, which can harm their interests because governments may only sometimes be willing to act on their behalf for various reasons.[33]

Another conceivable problem is that space projects are often undertaken jointly by more than one State or by more than one private entity belonging to more than one State, and no State can be expected to accept the binding nature of the Claims

[30] Zhijie Chen and Yun Zhao, 'Intellectual Property Protection in Outer Space: Conflict in Theory and Application in Practice', *Space Policy*, 61 (2022), 101484 https://doi.org/10.1016/j.spacepol.2022.101484

[31] Alessandra Marino and Thomas Cheney, 'Centring Environmentalism in Space Governance: Interrogating Dominance and Authority Through a Critical Legal Geography of Outer Space', *Space Policy*, 63 (2023), 101521 https://doi.org/10.1016/j.spacepol.2022.101521

[32] Bartosz Ziemblicki and Yevgeniya Oralova, 'Private Entities in Outer Space Activities: Liability Regime Reconsidered', *Space Policy*, 56 (2021), 101427 https://doi.org/10.1016/j.spacepol.2021.101427

[33] Huan Yu, 'The Development of China's Extraterritorial Mineral Resources Exploration and Exploitation in the Deep Seabed and Outer Space: An Evaluation from Policy and Legal Perspectives', *Resources Policy*, 93 (2024), 105060 https://doi.org/10.1016/j.resourpol.2024.105060

Commission's award if other participating launching States do not do the same.[34] Also, this mechanism cannot be applied to contractual disputes related to space activities; it only applies to liability for damage caused by space objects. Also, it is difficult to define and interpret some basic concepts such as damage, launching State, and fault, as the Convention only provides that compensation must be determined by international law and principles of justice and equity, without guiding how to measure damages and what compensation includes. Such omissions leave plenty of room for interpretation, and the Claims Commission may narrowly interpret the concept of damage, resulting in more minor compensation than expected.[35]

Also, the award of the Claims Commission will not be binding on the parties unless they agree on this.[36] Still, it will be merely a recommendation, and proving the fault of the launching State in the event of damage in space may constitute a significant problem given the characteristics of the outer space environment and the absence of previous practices. This mechanism can only be applied if both States are parties to the Liability Convention.[37] It is worth noting that until now, the Liability Convention has provided little benefit, not even in cases where resorting to it seems logical.[38] The only claim presented under the Liability Convention was Canada's claim in the Cosmos 954 incident. Caroline Arbaugh, 'Gravitating towards Sensible Resolutions: The PCA Optional Rules for the Arbitration of Disputes Relating to Outer Space Activities' (2014) 42 Georgia Journal of International and Comparative Law 825, 834; Fabio Tronchetti, supra note, 182.[39]

In 1978, a Soviet nuclear-powered satellite crashed over the northern territory of Canada; this prompted Canada to conduct search and recovery operations to remove radioactive debris on its territory and to take precautionary measures to

[34] Davide Petturiti, Gabriele Stabile, and Barbara Vantaggi, 'Addressing Ambiguity in Randomized Reinsurance Stop-Loss Treaties Using Belief Functions', *International Journal of Approximate Reasoning*, 161 (2023), 108986 https://doi.org/10.1016/j.ijar.2023.108986

[35] Balbir Singh and others, 'An Insight on Technical Regulations for New Activities in Space', *Acta Astronautica*, 225 (2024), 707–18 https://doi.org/10.1016/j.actaastro.2024.09.056

[36] Yongliang Yan, 'Anti-Weaponization of Outer Space for Maintaining Long-Term Sustainability of Outer Space Activities', *Space Policy*, 63 (2023), 101519 https://doi.org/10.1016/j.spacepol.2022.101519

[37] Yun Zhao and Shengli Jiang, 'Armed Conflict in Outer Space: Legal Concept, Practice and Future Regulatory Regime', *Space Policy*, 48 (2019), 50–59 https://doi.org/10.1016/j.spacepol.2019.01.004

[38] Avishai Melamed and others, 'Going to Outer Space with New Space: The Rise and Consequences of Evolving Public-Private Partnerships', *Space Policy*, 68 (2024), 101626 https://doi.org/10.1016/j.spacepol.2024.101626

[39] Georgios (George) D. Kyriakopoulos, 'On the Settlement of Space and International Telecommunications Related Disputes', *Acta Astronautica*, 211 (2023), 655–63 https://doi.org/10.1016/j.actaastro.2023.07.004

avoid potential risks to human health and the environment.[40] These operations generated expenses worth $3 million, for which Canada announced its intention to seek compensation under the Liability Convention, and many expected that this case would be settled through the Liability Convention mechanism, as the accident is subject to absolute liability provisions as it occurred on the Earth.[41] However, this dispute has not been resolved under the Liability Convention.[42]

The Liability Convention requires that the accident cause damage for liability to be established. Based on the Convention's definition of damage, a strict interpretation would cast doubt on whether there was any damage resulting from the Cosmos 954 accident because there was no loss of life, personal injury, or other deterioration in public health, and the lack of State practice can also lead to ambiguous interpretations of international treaties.[43] In the absence of any actual damage, the Soviet Union refused to participate in the dispute settlement procedures provided for in the Liability Convention; instead, in 1981, Canada and the Soviet Union signed a final settlement providing that the Soviet Union agreed to pay three million Canadian dollars in compensation to Canada for all damages caused by the Cosmos 954 satellite out of a goodwill gesture. There was no reference to the Liability Convention in that settlement.[44]

The Cosmos 954 incident demonstrates the limitations of the dispute resolution procedures set out in the Liability Convention. In terms of scope, it has been shown that it cannot include search and rescue expenses in the concept of damage, which gives a restrictive interpretation of the term damage. This also makes it clear that actual damage must be proven for the affected State to successfully invoke the Convention, as absolute liability assumes the fault of the launching State but does not assume the damage caused to the concerned State.[45] In a similar incident, on February 10, 2009, the Russian satellite Cosmos 2251 collided with the privately owned satellite Iridium 33, owned by a US private entity, destroying the latter at an altitude of 800 km above Siberia. The collision left behind thousands of

[40] Jie Long and Chuying Huang, 'Obligations and Liabilities Concerning the Active Removal of Foreign Space Debris: A Global Governance Perspective', *Acta Astronautica*, 222 (2024), 422–35 https://doi.org/10.1016/j.actaastro.2024.06.036

[41] Weishan Wang and Claudio Aporta, 'Arctic Marine Shipping Development and Governance in Canada: A Historical Overview', *Marine Policy*, 160 (2024), 105958 https://doi.org/10.1016/j.marpol.2023.105958

[42] Henry R. Hertzfeld, 'Unsolved Issues of Compliance with the Registration Convention', *Journal of Space Safety Engineering*, 8.3 (2021), 238–44 https://doi.org/10.1016/j.jsse.2021.05.004

[43] Dejian Kong, 'International Space Law for GNSS Civil Liability: A Possible Solution?', *Space Policy*, 48 (2019), 76–86 https://doi.org/10.1016/j.spacepol.2019.01.001

[44] Andrea Capurso, Paolo Marzioli, and Michela Boscia, 'Questions of Fault Liability: A Case Study Analysis of in-Orbit Collisions with Debris', *Journal of Space Safety Engineering*, 10.4 (2023), 439–46 https://doi.org/10.1016/j.jsse.2023.08.001

[45] Takuya Wakimoto, 'Ensuring the Safety of Commercial Space Transportation through Standardization: Implications of the Chicago Convention and ICAO Standards', *Space Policy*, 49 (2019), 101326 https://doi.org/10.1016/j.spacepol.2019.05.004

small pieces of space debris that will remain in orbit for decades and pose a risk of colliding with other objects in Earth's orbit. This event was the first-ever collision between two satellites in outer space. The collision between Iridium and Cosmos was a wake-up call for the space community. On the one hand, it showed that despite advanced technology capable of tracking objects orbiting the Earth, accidents still may occur in space. On the other hand, it also drew attention to the legal consequences of similar collisions.[46]

The dispute settlement procedures in the Liability Convention were never implemented, and no one even requested the formation of a Claims Commission in the Iridium/Cosmos collision due to the impossibility of proving fault of either party. This calls for a review of the Liability Convention procedures since if state parties have never used a set of provisions designed to deal with space disputes, it indicates a problem with the provisions that must be addressed.[47] The lack of an adequate and effective mechanism for settling space-related disputes in the international legal framework governing outer space activities does not mean such mechanisms exist. However, the limitations imposed on these mechanisms significantly reduce their importance and applicability.[48]

International Law Association Draft Convention on the Settlement of Space Law Disputes

The most comprehensive proposal for the settlement of outer space disputes is the Draft Convention on the Settlement of Space Law Disputes. In 1984, the Space Law Committee of the International Law Association adopted the Draft Convention on the Settlement of Space Law Disputes. The Draft Convention relies on the dispute settlement provisions contained in the UN Convention on the Law of the Sea and its annexes as a model because it represents the latest indication of what is acceptable in current State practice, with modifications to suit the nature of activities in outer space.[49]

The Draft Convention applies to all disputes arising from activities in or that have effects in outer space, whether carried out by States, international

[46] Charlotte Hook and others, 'Uncontrolled Reentries of Space Objects and Aviation Safety', *Acta Astronautica*, 222 (2024), 69–80 https://doi.org/10.1016/j.actaastro.2024.05.026

[47] Irina Chernykh and Daniil Volodin, 'The Principle of International Cooperation and Sharing of Information Principle under International Space Law: Towards Synergy', *Space Policy*, 67 (2024), 101593 https://doi.org/10.1016/j.spacepol.2023.101593

[48] Ram S. Jakhu, Bhupendra Jasani, and Jonathan C. McDowell, 'Critical Issues Related to Registration of Space Objects and Transparency of Space Activities', *Acta Astronautica*, 143 (2018), 406–20 https://doi.org/10.1016/j.actaastro.2017.11.042

[49] Warwick Gullett, 'The Contribution of the Law of the Sea Convention to Marine Environmental Protection: 40 Years of Shimmering Seas or High Hopes Dashed against Juridical Rocks?', *Marine Policy*, 149 (2023), 105498 https://doi.org/10.1016/j.marpol.2023.105498

organizations, or private entities.[50] This demonstrates the broad scope of the Draft Convention, as in terms of the substantive scope, it includes activities in outer space or activities that have effects in outer space, such as contractual disputes related to providing space services such as communications and the Internet, in contrast to the Liability Convention, which only includes disputes arising from damage caused by space objects.[51]

In terms of the personal scope, in contrast to the Liability Convention, the Draft Convention does not only apply to States and international governmental organizations, but individuals and non-governmental entities can also benefit from the provisions and procedures it provides, as all dispute settlement procedures stipulated in the Draft Convention are open to all contracting parties, including States, international organizations and private entities. Opening the proceedings to the private sector represents a modern approach to international law.[52] The Draft Convention stipulates an exclusion clause so that each party can exclude some space activities from its scope of application, limit its application to a specific type of space activities, or exclude the application of some provisions. This adds more flexibility to the Draft Convention and encourages countries to ratify it.[53]

The provisions of the Draft Convention do not apply to disputes to which the parties agree to submit to another procedure for peaceful settlement if such procedure would lead to a binding award. This text contains two fundamental aspects.[54] First, the Draft Convention is a secondary instrument, and the provisions of the Draft Convention are optional and do not apply unless the parties accept it, and the disputing parties may resort to other means to settle disputes. The second is that the disputing parties may resort to other means to settle disputes only if these other means lead to a binding award. Therefore, if the procedure resorted to by the parties does not lead to a binding award, the parties remain obligated to resolve their disputes according to the binding procedures stipulated in the Draft

[50] Kahlil Hassanali, 'Internationalization of EIA in a New Marine Biodiversity Agreement under the Law of the Sea Convention: A Proposal for a Tiered Approach to Review and Decision-Making', *Environmental Impact Assessment Review*, 87 (2021), 106554 https://doi.org/10.1016/j.eiar.2021.106554

[51] Tomasz Kamiński and Rafał Szewczyk, 'The Coastal State Obligation Not to Impede the Laying or Maintenance of Submarine Pipelines on the Continental Shelf According to United Nations Convention on the Law of the Sea', *Marine Policy*, 143 (2022), 105086 https://doi.org/10.1016/j.marpol.2022.105086

[52] Sarah Jane Fox, 'Policing Mining: In Outer-Space Greed and Domination vs. Peace and Equity a Governance for Humanity!', *Resources Policy*, 64 (2019), 101517 https://doi.org/10.1016/j.resourpol.2019.101517

[53] Brianna Bace, Yasir Gökce, and Unal Tatar, 'Law in Orbit: International Legal Perspectives on Cyberattacks Targeting Space Systems', *Telecommunications Policy*, 48.4 (2024), 102739 https://doi.org/10.1016/j.telpol.2024.102739

[54] Jinyuan Su and Jinxuan Li, 'Toward an International Legal Framework for the Protection of Outer Space Heritage', *Space Policy*, 2024, 101625 https://doi.org/10.1016/j.spacepol.2024.101625

Convention. However, the parties can still exclude the application of this provision under an exclusion clause.[55]

The Draft Convention provides a set of non-binding procedures that parties can resort to before binding procedures. These procedures include exchanging views and conciliation. If non-binding procedures fail to settle the disputes, any party can request that the dispute be referred to a competent judicial body to issue a binding decision. The parties can choose between the International Tribunal for Space Law, an arbitration tribunal, or the International Court of Justice. If the parties fail to select a jurisdiction or choose a different jurisdiction, the dispute can only be submitted to arbitration.[56]

The Draft Convention presents a noteworthy provision: the chosen judicial body will have jurisdiction over any dispute related to the interpretation or application of any international agreement related to the Draft Convention's purposes. This makes the judicial body have an important role in interpreting international space law and forming judicial precedents. However, this is doubtful and may not be correct, and this issue will be addressed again with more clarification when talking about the Optional Rules of the PCA.[57]

The judicial body shall apply the provisions of the Draft Convention and the appropriate rules of international law, any legal rules that the disputing parties agree to use, or any legal rules that the judicial body deems appropriate given the nature of the dispute.[58] The awards issued by the judicial body shall be final and binding, but only between the disputing parties and about the particular dispute. The draft convention foresees the establishment of an International Tribunal for Space Law, which would serve as a forum similar to the International Tribunal for the Law of the Sea.[59] This tribunal is established after the approval of at least 21

[55] Tommaso Sgobba and Mini Gupta, 'Proposing an International Convention for an Intermediate Region between Airspace and Outer Space Instead of the "Karman Line"', *Journal of Space Safety Engineering*, 9.2 (2022), 127–28 https://doi.org/10.1016/j.jsse.2022.05.003

[56] Timiebi Aganaba, 'A Cosmopolitan Approach to International Law (CAIL) Reflection on the Space Development Experience of Africa', *Space Policy*, 69 (2024), 101638 https://doi.org/10.1016/j.spacepol.2024.101638

[57] Lego Karjoko, Zaidah Nur Rosidah, and I Gusti Ayu Ketut Rahmi Handayani, 'Refleksi Paradigma Ilmu Pengetahuan Bagi Pembangunan Hukum Pengadaan Tanah', *BESTUUR*, 7.2 (2020), 1 https://doi.org/10.20961/bestuur.v7i1.42694

[58] Yavuz Özhan Türker, 'The Impact of the Right of Access to Information on Sustainable Development Goals under the Aarhus Convention', *Journal of Environmental Management*, 370 (2024), 122918 https://doi.org/10.1016/j.jenvman.2024.122918

[59] Chie Kojima, 'Integration of General Principles of International Environmental Law into the Law of the Sea: Assessment and Challenges', *Marine Policy*, 149 (2023), 105497 https://doi.org/10.1016/j.marpol.2023.105497

parties, and it sets the rules and procedures governing its tasks.[60] The proposed tribunal will not have exclusive jurisdiction over space disputes, and the disputing parties can refer the dispute to the International Court of Justice or any other means of settling the dispute when possible.[61]

However, this tribunal was never established. This is understandable, as it does not seem reasonable to expect most States to accept any international tribunal as the exclusive body to settle space law disputes, given the strategic importance of space exploration and space activities. The Draft Convention enters into force after 30 parties ratify it, but that has yet to happen, as no country has ratified the draft convention yet.[62] In general, the Draft Convention provides a comprehensive and flexible mechanism for settling space law disputes. The application of its procedures is subject to the approval of States, making it a voluntary rather than a binding mechanism. Unfortunately, not much can be done about the draft convention because no country has ratified it.

The PCA Optional Rules for Arbitration of Disputes Relating to Outer Space Activities

The Permanent Court of Arbitration is an international organization specialized in facilitating the settlement of disputes between States, governmental entities, international organizations, and private entities. Despite its name, the Permanent Court of Arbitration is not a court but a body with a roster of arbitrators available to resolve disputes. The only genuinely permanent feature is its International Bureau in Hague, which a Secretary-General heads.[63]

As previously explained, Iridium and Russia's inability to resolve their dispute using the mechanisms available under the Liability Convention made the international community aware of deficiencies in the framework governing the settlement of space-related disputes. This prompted the Permanent Court of Arbitration to attempt to address the issue of dispute settlement in outer space

[60] Caterina Milo, 'Tackling Lacunae in International Courts and Tribunals' Procedure: The Role of External Precedent', *The Italian Review of International and Comparative Law*, 2022, 1–24 https://doi.org/10.1163/27725650-02020006

[61] Jiangtao Qian, Kangjie Sun, and Yen-Chiang Chang, 'The Impact of the ITLOS Climate Change Advisory Opinion on the Development of International Law', *Marine Policy*, 170 (2024), 106406 https://doi.org/10.1016/j.marpol.2024.106406

[62] Xinxiang Shi, 'Distinction between Law Enforcement Activity and Military Activity in Article 298(1)(b) of UNCLOS: Commentary on Recent International Decisions', *Marine Policy*, 167 (2024), 106287 https://doi.org/10.1016/j.marpol.2024.106287

[63] Fabian Teichmann, Sonia Boticiu, and Bruno S. Sergi, 'The Risk of Abuse of Arbitration Proceedings in Jurisdictions Where Corruption Is Pervasive', *Journal of Economic Criminology*, 2 (2023), 100032 https://doi.org/10.1016/j.jeconc.2023.100032

and ultimately develop the Optional Rules for Arbitration of Disputes Relating to Outer Space Activities.[64]

In May 2009, the Administrative Council of the Permanent Court of Arbitration established an Advisory Group whose mission is to assess the need for a final and binding mechanism for the settlement of disputes relating to the use of outer space by States, international organizations, and private entities and develop optional rules to this end for inclusion in the Court's set of arbitration rules.[65] The Advisory Group concluded that there is a need for a dispute settlement mechanism in space law and that, to be effective, such a mechanism must be international, accessible to public and private parties, and capable of responding to the potentially significant demand for dispute settlement, and that international arbitration is the most appropriate method for settling space-related disputes, as it is open to all parties active in space, in addition to being a voluntary mechanism that only depends on the approval of the parties.[66] Arbitration awards are final, binding, internationally recognized, and enforceable in all States parties to the New York Convention. On 6 December 2011, the Administrative Council of the Permanent Court of Arbitration (PCA) adopted Optional Rules for Arbitration of Disputes Relating to Outer Space Activities.[67]

The Optional Rules for outer space disputes, the Advisory Group sought to enhance many of the characteristics of international arbitration. The wording was based on the 2010 Arbitration Rules of the United Nations Commission on International Trade Law (UNCITRAL),[68] amending them to suit the nature of space activities, taking into account the procedural rules that exist at the Permanent Court of Arbitration, namely the PCA Optional Rules of Procedure for Arbitrating Disputes between Two States (1992), the PCA Optional Rules for Arbitrating Disputes between Two Parties of Which Only One is a State (1993), the PCA Optional Rules for Arbitration between International Organizations and States (1996), the PCA Optional Rules for Arbitration of Disputes between

[64] Giovanna Adinolfi, 'Soft Law in International Investment Law and Arbitration', *The Italian Review of International and Comparative Law*, 1.1 (2021), 86–112 https://doi.org/10.1163/27725650-01010005

[65] Yen-Chiang Chang and others, 'Frontier Issues in International Ocean Governance: Japan's Discharge of Nuclear Contaminated Water into the Sea', *Marine Pollution Bulletin*, 198 (2024), 115853 https://doi.org/10.1016/j.marpolbul.2023.115853

[66] Gabriela Argüello, 'Large-Scale Collective Action in the Arctic Ocean: The Role of International Organizations in Climate Governance', *Ocean & Coastal Management*, 211 (2021), 105706 https://doi.org/10.1016/j.ocecoaman.2021.105706

[67] Gabriele Asta, 'Double Degree of Jurisdiction in International Adjudication', *The Italian Review of International and Comparative Law*, 1.2 (2022), 471–78 https://doi.org/10.1163/27725650-01020016

[68] Chamundeeswari Kuppuswamy and Daria Boklan, 'Beyond Free Trade in Raw Materials: Reconciling International Trade Rules with Planetary Boundaries', *The Extractive Industries and Society*, 19 (2024), 101481 https://doi.org/10.1016/j.exis.2024.101481

International Organizations and Private Parties, and the PCA Optional Rules for Arbitration of Disputes Relating to Natural Resources and/or the Environment.[69]

The Optional Rules for Outer Space Disputes of the PCA do not create new rules for settling Outer Space disputes because they are only procedural. They are also optional rules that only apply if the disputing parties agree. They also give the disputing parties broad discretion regarding the selection of arbitrators and the rules that must be applied, as the disputing parties can agree to amend the rules as they desire.[70] The scope of application of the Optional Rules for outer space disputes is vast, and all actors involved in space activities, including States, international organizations, and private entities, are entitled to rely on them.[71] What increases the acceptability and applicability of the Optional Rules for outer space disputes is that characterizing the dispute as related to outer space is not a necessary precondition for settling the dispute, as the geographical, technological, or other characteristics of the dispute do not prevent the parties from resorting to these Optional Rules. Therefore, applying the Optional Rules for outer space disputes depends only on the parties' will.[72]

The Optional Rules for outer space disputes attempt to address some of the fundamental gaps in existing dispute settlement mechanisms in international space law. They were intended to give the disputing parties the option of using a means of dispute resolution that would be open to all space actors, regardless of their governmental or non-governmental nature, appropriate to the specificities of space activities, and binding.[73] The PCA does not appoint arbitrators directly, but the disputing parties do so. If the disputing parties do not agree on the selection of arbitrators, the appointing authority shall, upon the request of one of the parties, appoint the arbitrators. The Optional Rules for outer space disputes consider the technical nature of space activities and the need for legal and scientific expertise in space-related matters, so a list of arbitrators with experience in space-related

[69] Anastasia Kalantzi, 'Parallel Arbitral Proceedings: An Analysis of the Issue of Parallel Arbitrations in International Commercial Arbitration within the European Legal Space', *The Italian Review of International and Comparative Law*, 3.1 (2023), 1–27 https://doi.org/10.1163/27725650-03010001

[70] Benoit Pierre Freyens and Xiaodong Gong, 'Judicial Arbitration of Unfair Dismissal Cases: The Role of Peer Effects', *International Review of Law and Economics*, 64 (2020), 105947 https://doi.org/10.1016/j.irle.2020.105947

[71] Ruqaya S. Al-Sabah and Sarah S. Al-enezi, 'Reducing Contract Disputes: A Comparative Analysis of FIDIC and GCC Standard General Conditions of Contract for Construction Projects', *Journal of Engineering Research*, 2024 https://doi.org/10.1016/j.jer.2024.09.015

[72] Uri Ansenberg, Nufar Avni, and Gillad Rosen, 'Exploring Real Estate Valuation Practices in an Informal Market', *Habitat International*, 147 (2024), 103069 https://doi.org/10.1016/j.habitatint.2024.103069

[73] He Qisong, 'The Order of Law-Based vs. Rules-Based: The Competition in Space Order between China and the United States', *Advances in Space Research*, 73.1 (2024), 1006–18 https://doi.org/10.1016/j.asr.2023.10.020

matters is prepared.[74] The Optional Rules for outer space disputes also address issues of immunity, as one of the main problems preventing the settlement of space disputes is the possibility of States claiming immunity from the jurisdiction of any arbitration body. The Rules address this issue by stipulating that an agreement to arbitrate under the Optional Rules constitutes a waiver of any right to immunity from jurisdiction, which applies to States and intergovernmental organizations.[75]

Although the motivation behind this ruling is unclear, it has focused primarily on combating sovereign immunity and the immunity of intergovernmental organizations. Whether or not this waiver is a welcome achievement is familiar, given that waivers already exist under customary international law, where the arbitration agreement constitutes a waiver of immunity from jurisdiction. However, this waiver does not extend to the enforcement of the arbitration award, as there must be express agreement by the parties concerned to waive immunity from enforcement.[76] This provision indicates that the arbitration agreement would only constitute a waiver for jurisdictional purposes. Under this provision, enforcement of an arbitration award where one party is entitled to immunity will require an express waiver of immunity against enforcement, which may cause a problem when a party wishes to evade its obligations under the arbitration award.[77]

The problem of immunity is not only related to the recognition of the arbitral tribunal's jurisdiction but also to the implementation of the arbitration award. According to the New York Convention, the implementation of the arbitration award is subject to the legislation of the country in which the implementation of the award is requested. Any country may refuse to implement an arbitration award against its financial property because it affects its sovereignty and conflicts with its public policy.[78]

The New York Convention requires signatory States to enforce an arbitration award issued in another signatory State as long as there is no reason to refuse enforcement. However, even if States are receptive to the jurisdiction of an arbitral

[74] Pavel Semerád, 'Asteroid Mining Tax as a Tool to Keep Peace in Outer Space', *Space Policy*, 65 (2023), 101555 https://doi.org/10.1016/j.spacepol.2023.101555
[75] Florian Vidal and Roman Privalov, 'Russia in Outer Space: A Shrinking Space Power in the Era of Global Change', *Space Policy*, 69 (2024), 101579 https://doi.org/10.1016/j.spacepol.2023.101579
[76] Matthieu Maréchal, 'A Sufficient Condition for Metric Subregularity of Set-Valued Mappings between Asplund Spaces Based on an Outer-Coderivative-like Variational Tool', *Heliyon*, 9.10 (2023), e20314 https://doi.org/10.1016/j.heliyon.2023.e20314
[77] Shahid Hussain and Khurram Shahzad, 'India's Quest for "Global Space and Influence" through the "Outer Space" Domain', *Journal of Space Safety Engineering*, 10.3 (2023), 351–65 https://doi.org/10.1016/j.jsse.2023.05.004
[78] Hongwei Jiao, Wenjie Wang, and Youlin Shang, 'Outer Space Branch-Reduction-Bound Algorithm for Solving Generalized Affine Multiplicative Problems', *Journal of Computational and Applied Mathematics*, 419 (2023), 114784 https://doi.org/10.1016/j.cam.2022.114784

tribunal, compliance with arbitration awards may be unacceptable to them. This highlights a flaw in optional rules, as they must provide legal certainty regarding implementing the prize.[79]

The arbitral tribunal applies the rules of law determined by the parties. Suppose the parties fail to reach an agreement on the applicable law. In that case, the arbitral tribunal applies the national or international law it deems appropriate, considering the contract's provisions and global trade practices. Regarding confidentiality, since the issue of privacy may discourage parties from submitting their case to an arbitral tribunal for fear of disclosing sensitive information, the Optional Rules for outer space disputes allow the arbitration tribunal, at the request of a party, to appoint a confidentiality advisor, whose task is to report to the court on specific issues on a confidential basis, without revealing the content of any confidential information, whether to the other party or to the court itself.[80]

The parties most concerned with confidentiality provisions are space companies that spend huge sums on research and development of their technology, and confidentiality provisions encourage the use of the Optional Rules for outer space disputes by reducing concerns that disclosure of confidential information poses a threat to competitive advantage in the market. The Optional Rules for outer space disputes contain several provisions to prevent unnecessary delays resulting from the conduct of one of the parties or from the failure of the arbitrator to perform his duties. These provisions ensure that arbitration is conducted expeditiously and within a reasonable time.[81]

The arbitration award is final and binding on the parties, and the parties are obligated to comply with it without delay. This is a basic condition for creating a climate of certainty in the field of commercial space activities. The parties may request the court to provide an interpretation for the award, which will form an integral part of it.[82] The innovative nature of the Optional Rules for outer space disputes is that if the parties choose to settle their dispute by arbitration and agree to resort to the Permanent Court of Arbitration, they can benefit from the Procedural Rules of Arbitration explicitly designed for outer space activities. The

[79] HouYang Du and Hang Guo, 'Establishment of Environmental Tribunals and Corporate Outward Investment Behaviour', *Finance Research Letters*, 67 (2024), 105795 https://doi.org/10.1016/j.frl.2024.105795

[80] Omar Hisham Al Hyari and Abdullah Rabee Al Ani, 'Post Award Arbitral Tribunal's Mandate under the UNCITRAL Model Law and National Laws Based Thereon', *Heliyon*, 7.7 (2021), e07556 https://doi.org/10.1016/j.heliyon.2021.e07556

[81] Niccolò Zugliani, 'A Role for Precedent in the Determination of the Standard of Review Applicable by Investment Arbitral Tribunals? A Case Study of Ect-Based Energy Disputes Against Spain', *The Italian Review of International and Comparative Law*, 2022, 1–20 https://doi.org/10.1163/27725650-02020008

[82] Aygun Mammadzada, 'Arbitral Anti-Suit Measures: Implications of Mutual Trust', *The Italian Review of International and Comparative Law*, 3.1 (2023), 28–60 https://doi.org/10.1163/27725650-03010002

PCA Optional Rules for outer space disputes provide an excellent basis for resolving outer space-related disputes. It is worth noting that the Optional Rules for outer space disputes do not only apply to conflicts that occur in outer space but can also be used in disputes that occur on Earth and are related to space activities, such as breach of contractual obligations or failure to pay launch costs, etc.[83]

In the context of outer space, conflicts may arise as a result of a variety of events. Sometimes, describing a dispute as related to outer space can be problematic because it may lack a direct connection to an event that occurred in space while still being generally associated with specific space actions. To understand this point, one should keep in mind that outer space disputes may arise due to incidents in space or events on Earth.[84] Regarding the first point, a conflict may occur due to a collision between active or inactive satellites. Although collisions in space have been minimal so far, the Iridium/Cosmos collision proved that this possibility cannot be ruled out. Experts believe that due to the gradual crowding of Earth's orbits, the technical impossibility of tracking all space objects, including debris, and the impossibility of predicting whether a collision will occur, the probability of more collisions is expected to increase. Conflicts may also arise due to the practical uses of satellites, for example, when operators of communications and remote sensing satellites fail to provide agreed services to stakeholders.[85]

As for the second point, disputes may arise about a space activity that has been contractually arranged but has yet to be undertaken, such as a non-performance or breach of contract. This may be the case for outstanding pre-launch payments, delay of the launch for unjustified reasons, and termination of the launch contract for reasons different from those listed in the contract. In such cases, it may be difficult to classify these disputes as related to outer space because the causes of the conflict do not occur in space but relate to contractually agreed space activities planned to be carried out in space later. The Permanent Court of Arbitration has addressed this issue by adopting a flexible and innovative approach, which allows outer space rules to be applied broadly, regardless of whether the dispute relates to outer space.[86]

---

[83] Roberto Ruoppo, 'Common Features of the Right to Property and International Investments: Evidence from the Use of ECtHR Case-Law in Investment Tribunals' Decisions', *The Italian Review of International and Comparative Law*, 2022, 1–23 https://doi.org/10.1163/27725650-02020007

[84] N. Kansu Okyay, 'The Applicability of the Brussels I Bis Regulation to Hybrid Dispute Resolution Clauses', *The Italian Review of International and Comparative Law*, 3.1 (2023), 61–86 https://doi.org/10.1163/27725650-03010003

[85] Francesco Seatzu and Paolo Vargiu, 'Three Views of a Secret: Missed Opportunities in the Echr's Recent Case-Law on International Commercial Arbitration', *The Italian Review of International and Comparative Law*, 1.2 (2022), 203–23 https://doi.org/10.1163/27725650-01020001

[86] Se Mi Park, 'Commercial Arbitration Regime and Sourcing Decision', *International Review of Law and Economics*, 78 (2024), 106195 https://doi.org/10.1016/j.irle.2024.106195

Such a dispute arose in 2012 between the mobile satellite services provider (Globalstar) and the launch services provider (Arianespace), where (Globalstar) defaulted on outstanding payments from three launches conducted in 2010 and 2011, and (Arianespace) warned it that if payment were not settled by late August 2012, the fourth and final (Globalstar) launch scheduled for the end of the year would be suspended. The dispute was finally settled amicably between the two companies on September 18, 2012, when (Globalstar) agreed to pay Arianspace's outstanding costs.[87]

But assuming that the two companies were unable to resolve the dispute amicably, resorting to arbitration before the PCA may be an appropriate option, as it is not possible to settle this dispute through the Liability Convention because the dispute is between private entities, and resorting to the local judiciary would also raise complex issues related to jurisdiction and applicable law. However, if Arianespace and Globalstar chose to resolve their dispute through arbitration before the PCA, the issue of jurisdiction and applicable law would not be an obstacle, and the companies would be free to choose the relevant law.[88]

Another necessary provision is the possibility of resorting to the Optional Rules for outer space disputes to resolve disputes related to the agreement of States on the use of outer space and the interpretation and application of that agreement. This means that arbitral tribunals will play a role in interpreting the United Nations space law treaties, which gives greater importance to their awards. Although this is theoretically possible, consolidated practice at the COPUOS Legal Subcommittee shows that, contrary to the scholarly literature, States do not support the interpretation of treaties by international institutions concerned with space law matters.[89]

For example, while recognizing that the rules of interpretation applicable to space treaties are those contained in the Vienna Convention on the Law of Treaties, States have consistently maintained that only States Parties to a treaty can provide a formal interpretation of that treaty. As a result, the COPUOS and its Legal Subcommittee cannot offer official interpretations of the UN space treaties. The UN General Assembly has recognized this view, which indicates that States

[87] Pierre Clément Mingozzi, 'The Contribution of Itlos to Fight Climate Change: Prospects and Challenges of the Cosis Request for an Advisory Opinion', *The Italian Review of International and Comparative Law*, 3.2 (2023), 306–24 https://doi.org/10.1163/27725650-03020008

[88] Julio Alberto Tilloy, 'The Itlos Jurisprudence Regarding the Procedural Obligation to Conduct an Environmental Impact Assessment and Its Significance for Deep Seabed Mining', *The Italian Review of International and Comparative Law*, 3.2 (2023), 325–47 https://doi.org/10.1163/27725650-03020009

[89] Jiaxin Zhu and Qi Xu, 'Reflections on the Settlement of Fisheries Disputes between the EU-UK in the Post-Brexit Era: Lessons for China's Fishery Enforcement Disputes Settlement', *Marine Policy*, 169 (2024), 106365 https://doi.org/10.1016/j.marpol.2024.106365

will not accept the interpretations of the UN space treaties offered by the arbitral tribunal.[90]

Compared with the UN space treaties, the PCA Optional Rules for outer space disputes introduce several new aspects. They apply to any space-related dispute without any restrictions in scope and depart from the approach taken by the Liability Convention, which applies only to disputes arising from damage caused by space objects. Parties can also modify the PCA Optional Rules for outer space disputes to suit their needs, effectively ensuring adequate understanding of technical issues while maintaining confidentiality of information.[91] The PCA Optional Rules for outer space disputes are also available to States, international organizations, and private actors. Extending the scope of the Optional Rules to non-state actors, such as private companies and individuals, represents a significant shift away from the State-focused approach to dispute resolution that characterizes the Liability Convention. The PCA Optional Rules for outer space disputes also address the issue of immunity by considering the parties' acceptance to refer the dispute to arbitration as a waiver of any right to immunity from jurisdiction, and the arbitration award is final and binding on the parties.[92]

However, the authors agree with some scholarly literature that recognizes these features as an inherent part of international commercial arbitration and most forms of arbitration and are not unique to the PCA Optional Rules. They also agree that the PCA could have been a center for resolving space activity disputes before adopting these Optional Rules. Although designed as a voluntary and binding means of settling space disputes, the PCA Optional Rules for outer space disputes have never been used in practice, even in the case of "CC/Devas (Mauritius) Ltd., Telcom Devas Mauritius Limited, and Devas Employees Mauritius Private Limited v. Republic of India" before the PCA, which is related to a dispute over an investment agreement about telecommunications, the UNICTRAL Rules of 1976 were used, not the Optional Rules for Arbitration of Disputes Relating to Outer Space Activities.[93]

---

[90] Josef C. Brada and others, 'Value Creation and Value Destruction in Investor-State Dispute Arbitration', *Journal of Multinational Financial Management*, 63 (2022), 100728 https://doi.org/10.1016/j.mulfin.2021.100728

[91] Francesca Sironi De Gregorio, 'Proving Environmental Harm in Inter-State Litigation: Challenges and Evolving Strategies', *The Italian Review of International and Comparative Law*, 3.2 (2023), 348–66 https://doi.org/10.1163/27725650-03020010

[92] María Catalina García Ch. and Joyeeta Gupta, 'Environmental and Sociocultural Claims within Maritime Boundary Disputes', *Marine Policy*, 139 (2022), 105043 https://doi.org/10.1016/j.marpol.2022.105043

[93] Rob Aitken, 'Extractive Separations: A Polanyian Note on the International Investment Treaty Regime', *The Extractive Industries and Society*, 20 (2024), 101559 https://doi.org/10.1016/j.exis.2024.101559

Dubai's Court of Space

The UAE seeks to be a major player in space exploration and strengthen its position as a global hub for trade, logistics, finance, innovation, and technology. The UAE recently greatly enhanced its scientific capabilities, with the UAE's Hope Probe successfully entering Mars orbit. In 2021, the DIFC Courts and Dubai Future Foundation launched the Future Courts initiative, establishing the Space Court. The initiative aims to develop the UAE's judicial systems to play a leading role in settling commercial disputes related to outer space.

The Dubai Space Court has yet to enter into force and needs detailed rules like those of the Permanent Court of Arbitration. It is still under development and may only begin operating temporarily. However, two space dispute guides have been issued to give an idea and outlook on the disputes over which the Court will have jurisdiction. Although these two guides do not contain detailed rules about the mechanism for resolving space disputes, they will be discussed to serve the research purpose. The Space Court initiative is based on three main steps: establishing an international Working Group of specialists and experts in international space law and providing a future outlook on possible scenarios for space disputes. This is followed by the creation of the Space Disputes Guide, which includes a set of guidelines for space disputes, and finally, training judges by international and regional entities to become experts in space-related disputes.[94]

The training of judges by international entities on space disputes is a commendable step. It represents a significant advance in the global framework for resolving space disputes, as the disputing parties will be able to present their disputes to an expert, specialized judicial body trained in space disputes and will be spared the risk of submitting the dispute to international arbitration bodies that may not be equipped to deal with space disputes and having the dispute decided by arbitrators who may not be experts in international space law.[95]

The first edition of the Space Disputes Guide was established on 11 October 2021, and it has been prepared to clarify the types of space-related disputes that the DIFC Courts are equipped to hear and adjudicate. According to the first edition of the Space Disputes Guide, the DIFC Courts hear space disputes whose parties are States, governmental entities, private entities, or individuals and whose subject relates to the manufacture, launch, or return of a space object or any other types of space object operations, as well as disputes whose subject relates to a contractual or regulatory dispute, a dispute over compensation for damage, or an international dispute related to the implementation or interpretation of an

[94] Aitken.
[95] Xidi Chen and Qi Xu, 'Reflections on International Dispute Settlement Mechanisms for the Fukushima Contaminated Water Discharge', *Ocean & Coastal Management*, 226 (2022), 106278 https://doi.org/10.1016/j.ocecoaman.2022.106278

international treaty.[96] The DIFC Courts are a discretionary jurisdiction, meaning that parties worldwide are free to bring their disputes before them, regardless of where they are located. The DIFC Courts provide a unique English standard law system, providing prompt and independent justice to resolve domestic and international commercial or civil disputes. The DIFC Courts provide certainty through transparent and enforceable rulings from internationally recognized judges who adhere to the highest global legal standards.[97]

The first edition of the Space Disputes Guide provides two scenarios for cases over which the DIFC Courts have jurisdiction. Scenario A: Company A launched a satellite at a cost of approximately US$200 million. After two months of service, the satellite was hit by a piece of space debris, which destroyed the satellite. A tracking station that monitors space debris concluded that the piece of space junk originated from a defunct satellite of Company B that was destroyed in 2007, which created nearly 3,500 additional fragments of space junk in orbit between 160 kilometers and 2,000 kilometers above the Earth's surface. Company A intends to file a claim against Company B seeking compensation for the satellite's destruction. The parties disagree over the most appropriate and neutral forum to refer their dispute to, as their ultimate desire is to have said dispute settled in a neutral jurisdiction by experienced judges with subject matter expertise under a system that provides speedy and transparent justice. Company A then brings its claim to the DIFC Courts for adjudication.[98]

The conflict reflected in Scenario A requires the questioning of witnesses and the appointment of experts. The parties can expect the claim to progress as follows: Company A must submit the claim form and details within six months of the date the damage occurred, Company B must submit a defense within 45 days of filing the claim, and Company A must submit a response to the defense within 25 days. The DIFC Courts will then set a conference to manage the case, witness statements will be exchanged within ten weeks, and a response must be submitted within two weeks of the initial exchange. Company A must submit its experience report within two weeks of the start of the evidence phase, and Company B must submit its experience report within two weeks of the date Company A submits its experience report. The experts then meet and prepare the case file and ensure all requirements are completed before submitting it to the DIFC Courts. All

[96] Ningyao Ye and Zeyu Zhao, 'The Reform of Consumer Protection in Mobile Payment Services in China: Legislation, Regulation, and Dispute Resolution', *Computer Law & Security Review*, 54 (2024), 106007 https://doi.org/10.1016/j.clsr.2024.106007

[97] Zenglin Han and others, 'The Philippines' Hedging Strategy against China in the South China Sea Dispute: Based on the Human-Ocean Regional System', *Marine Policy*, 151 (2023), 105578 https://doi.org/10.1016/j.marpol.2023.105578

[98] Erik Franckx, 'A Single Maritime Boundary: From UNCLOS III to Present-Day Developments', *Marine Policy*, 148 (2023), 105425 https://doi.org/10.1016/j.marpol.2022.105425

documents must be submitted to the Registry of the DIFC Courts at least one week before the trial begins.[99]

Company A has three options: The first option is to resort to the government of its country to file a claim on its behalf under the Liability Convention against the country to which Company B belongs. Here, the government must first agree to act on behalf of Company A, as it is not obligated to agree to Company A's request and may refuse for political, economic, or other reasons. First, an attempt must be made to settle the two countries through diplomatic channels within a year from the date of the collision. Company A cannot file the claim itself, as the dispute settlement mechanism in the Liability Convention is reserved for countries only. If the two countries fail to reach a solution, the country's government, which is the one to which Company A belongs, can request the establishment of a Claims Committee to resolve the dispute. Here, the fault of Company B must be proven, as the accident occurred in outer space, and this is a significant problem, as the Liability Convention does not clearly state what is meant by fault. Its interpretation may differ from one case to another. What compensation may include, especially for lost profits, must be clarified. Therefore, this option may not be preferable for Company A.[100]

The second option is to resort to the competent national courts of the country to which Company B belongs and file a lawsuit against Company B to claim compensation under the liability law of that country. This option may raise issues related to the jurisdiction of the Court to hear the case and the suitability of the law of that country to adjudicate space collision cases, in addition to the issue of applicable law and implementation, as Company B may challenge the jurisdiction of the Court. Even in this case, Company A must prove that Company B was at fault and had a duty to avoid the collision. Since no international treaties or standards obligate countries to remove space debris, Company B may argue that it has no legal obligation to dispose of its space debris. Therefore, it will be difficult for Company A to prove the fault of Company B.[101]

The third option is to resort to international commercial arbitration. Still, in this scenario, even if the arbitration body accepts to adjudicate the dispute, it will be decided by arbitrators who are not specialists in space-related disputes. Therefore, these three options must provide a satisfactory solution to the conflict. However, if the parties agree to refer their case to Dubai's Court of Space, this would provide several advantages, including the fact that Company A can take action directly

[99] Kangyun Bao and Shenghua Lu, 'Judiciary-Driven Finance: Quasi-Experimental Evidence from Specialized Financial Adjudication Institutions in China', *International Review of Law and Economics*, 80 (2024), 106227 https://doi.org/10.1016/j.irle.2024.106227

[100] Maria Lucas-Rhimbassen, 'The COST of Joining Legal Forces on a Celestial Body of Law and Beyond: Anticipating Future Clashes between Corpus Juris Spatialis, Lex Mercatoria, Antitrust and Ethics', *Space Policy*, 59 (2022), 101445 https://doi.org/10.1016/j.spacepol.2021.101445

[101] Lucas-Rhimbassen.

against Company B without asking its government to act on its behalf. The dispute will be resolved and settled by a panel of judges specialized and experienced in space-related disputes, and the dispute will be decided quickly. A binding decision will be issued, enforceable in most countries.[102]

Scenario B: "Orbit LLC" is preparing a vessel to be launched to space, under the directives of "The Republic of Galactica," to send a mission to the International Space Station. Orbit LLC's primary objective in this mission is to test out new spacesuits manufactured by "Lunar Clothing Limited" to proceed with installing solar panels in the ISS. Orbit LLC sought a guarantee from "Bank InterSpace" to pay Lunar Clothing Limited for the spacesuits, which the Bank provided a month before the vessel launch. Lunar Clothing has learned from media reports that Bank InterSpace had become insolvent and, therefore, found the guarantee provided to Lunar Clothing by Orbit LLC to be without value. Orbit LLC refused to return the spacesuits to Lunar Clothing – citing that the vessel launch was scheduled within four days and could not be rescheduled. Lunar Clothing, concerned that Orbit LLC would not be able to fulfill its commitments towards it, obtained advice from its legal team that the best course of action would be to prevent the vessel launch through a court order. As the agreement between Orbit LLC and Lunar Clothing contained a clause by which the DIFC Courts could resolve any dispute, Lunar Clothing brought a claim seeking injunctive relief from the DIFC Courts.[103]

The dispute in Scenario B could arise when the plaintiff seeks a decision from the Court on a matter unlikely to involve a substantive disagreement. The parties can expect the claim to be considered as follows: Lunar Clothing Limited must accompany its claim form with the evidence it intends to rely on within four months if Orbit LLC is within Dubai or six months outside Dubai. Orbit LLC must submit its response 14 days after submitting the claim form with the evidence it intends to rely on. Within the following 14 days, Lunar Clothing Limited may submit an additional written report in response to Orbit LLC's report. The DIFC Courts will then provide guidance on the future management of the case.

The second edition of the Space Disputes Guide was established on 14 February 2023. This Edition explores legal frameworks of jurisdiction that could be considered within the Courts of Space, thus displaying how the Courts of Space can serve as a neutral forum for disputes of the nature set out within this Guide

[102] Sampath Suranjan Salins and others, 'Performance Characterization of an Adaptive-Controlled Air Handling Unit to Achieve Thermal Comfort in Dubai Climate', *Energy*, 273 (2023), 127186 https://doi.org/10.1016/j.energy.2023.127186

[103] Elfrida Ratnawati and others, 'Is the Master Civil Liable Based on Sea Freight Arrangements in Indonesia?', *Journal of Human Rights, Culture and Legal System*, 4.1 (2024), 209–36 https://doi.org/10.53955/jhcls.v4i1.194

while also making determinations on the choices of law best suited to the disputes being explored herein.[104]

The second edition sets out situations where the DIFC Courts can provide prompt and independent justice as a body with optional jurisdiction. The second version distinguishes between a group of possible scenarios. For example, if the conflict occurred within a single space object registered under one State, the State has the jurisdiction over the conflict. However, suppose the space object was registered under more than one State or the dispute occurred between several space objects belonging to several States, and there was no agreement clarifying the judicial body competent to hear disputes here. In that case, the DIFC Courts can be resorted to as a judicial body with optional jurisdiction that provides prompt and independent justice.[105]

The DIFC Courts of Space are flexible in their ability to support parties who elect the Courts' jurisdiction in the agreement phase or after a dispute arises. The Courts provide both parties with specialized judges on space station and space economy issues. Both parties will be able to use the Courts as a neutral forum. Furthermore, the DIFC Courts, unlike other dispute resolution courts, issue binding judgments, thus absolving the parties from having to seek further ratification procedures.[106] Although it is too early to evaluate Dubai's Court of Space at the moment, as it has yet to enter into force, some issues should be pointed out from the two Space Disputes Guides. First, the trial procedures at Dubai's Court of Space are characterized by their strict deadlines, as the case must be filed, evidence must be presented, witnesses must be heard, expert reports must be submitted, and the entire case file must be submitted to the Court within strictly specified dates, which in turn leads to the issuance of binding decisions for the parties in a very short time, unlike other arbitration bodies that seek to issue an award within a reasonable period, without this being accompanied by specific times that must be adhered to. It also ensures that the conflicting parties do not intentionally procrastinate and prolong the conflict without justification, so they

[104] Maximilien Berthet and Riccardo Corrado, 'Review and Comparison of Three Emerging Regional Space Agencies: The African Space Agency, the Arab Space Coordination Group, and the Latin American and Caribbean Space Agency', *Space Policy*, 68 (2024), 101624 https://doi.org/10.1016/j.spacepol.2024.101624

[105] Sapriani Sapriani, Reza Octavia Kusumaningtyas, and Khalid Eltayeb Elfaki, 'Strengthening Blue Economy Policy to Achieve Sustainable Fisheries', *Journal of Sustainable Development and Regulatory Issues (JSDERI)*, 2.1 (2024), 1–19 https://doi.org/10.53955/jsderi.v2i1.23

[106] Ayami Kojima, Daniel García Yárnoz, and Simonetta Di Pippo, 'Access to Space: A New Approach by the United Nations Office for Outer Space Affairs', *Acta Astronautica*, 152 (2018), 201–7 https://doi.org/10.1016/j.actaastro.2018.07.041

must adhere to these deadlines precisely. Otherwise, this may lead to harming their interests.[107]

Second, and from what the current situation appears to be, Dubai's Court of Space will not be an arbitration body but an actual court. It is subject to the DIFC Court Law No. 10 of 2004 and its amendments and the procedural rules applicable within the Court. The DIFC Court is an independent judicial body with its own procedural and substantive laws that it applies to disputes brought before it, such as contract law, companies law, leasing law, intellectual property law, and others. Therefore, resorting to Dubai's Court of Space would be tantamount to a judicial court, not to an arbitration body, which would have several legal consequences.

First, there will not be arbitrators but judges, and the disputing parties do not appoint the judges, but the Court does so. The Court will have judges specialized in space law who will adjudicate space disputes, unlike other arbitration bodies where the disputing parties appoint the arbitrators. One of the areas for improvement of arbitration in space disputes is the need for familiarity of the disputing parties and arbitrators with space law. The continuous development of space activities and the emergence of new activities, such as space tourism and the exploitation of space resources, will raise unique questions in space law. In those cases, the disputing parties, and even the arbitration institution, may need to know which arbitrator is best suited to resolve the dispute. Here, Dubai's Court of Space seeks to overcome this problem by providing specialized judges in space law and subjecting them to training courses by regional and international bodies. Thus, the judges can give the disputing parties a great deal of confidence that specialized judges will solve their disputes. Secondly, in principle, unlike other arbitration bodies, the judges will determine the law applicable to the dispute, not the disputing parties. Nevertheless, if the dispute involves a foreign element, the parties can choose the applicable law under the general rules.[108]

Third, the procedures will be public, and the court decisions will be published unless the Court decides otherwise. This, in turn, has two aspects: a positive aspect and a negative aspect. The negative aspect is that the disputing parties will not be able to benefit from the advantage of confidentiality provided by other arbitration bodies, which may put their interests at risk because the dispute resolution procedures involve revealing sensitive and strategic information that may affect the competitive advantage of the disputing parties. As for the positive aspect, the

[107] Lawrence Rubin, 'A Middle East Space Race? Motivations, Trajectories, and Regional Politics', *Space Policy*, 69 (2024), 101608 https://doi.org/10.1016/j.spacepol.2023.101608
[108] Lucien Rapp, Maria Topka, and Lucas Mallowan, 'Which Jurisdiction for Private In-Space Assembled Autonomous Platforms?', *Space Policy*, 56 (2021), 101413 https://doi.org/10.1016/j.spacepol.2021.101413

publicity of the procedures and publishing the court decisions would provide judicial precedents issued by a court competent to adjudicate space disputes.[109]

Although arbitration awards are sometimes published in several fields, one of the general features of arbitration is that arbitration awards are usually not published. In most cases, the facts of the dispute and the arbitration award remain confidential. Thus, arbitration cannot provide judicial precedents for future use like court decisions do. Therefore, the decisions of Dubai's Court of Space can constitute an essential source of law in practice. Given that space, law is a relatively new branch of international law, with many problems surrounding some of its aspects, and given that court cases in this sector are relatively rare, published judicial decisions in outer space disputes will be of particular value, although of course, they are not binding. Publication of court decisions in space sector disputes would be welcome and could significantly enhance predictability and transparency in resolving space-related disputes.[110]

Some criticize the creation of a unique body or tribunal for space disputes, arguing that there have been so few cases litigated under space law that any special court should be dedicated to such cases and that it is impractical today to establish a permanent court or tribunal of dedicated judges to deal with such disputes at a time when there is no certainty that there will be demand for such courts. While this criticism is valid, at least for now, it does not apply to Dubai's Court of Space. The DIFC Courts were established in 2004, and the Court of Space judges will not only be dedicated to adjudicating space disputes, but they can also adjudicate other cases as judges within the courts, which is what their work requires. They will be equipped with sufficient experience and knowledge of space law to enable them to adjudicate space disputes fairly, transparently, and expeditiously.

4. Conclusion

The rapid growth of the space industry has created an urgent need for effective mechanisms to address the inevitable rise in space-related disputes. A comprehensive and universally acceptable dispute resolution framework is crucial for the modern space sector. Unfortunately, the existing mechanisms are inadequate for handling the sector's unique complexities and have failed to gain widespread acceptance among stakeholders. The United Nations space treaties, for example, lack enforcement powers and primarily cater to state parties, excluding private entities, which are now major players in the space industry. This exclusion, combined with the limited scope of the treaties, leaves many disputes

[109] Michael Byers, Aaron Boley, and Ewan Wright, 'Letter to Space Agency Leaders on Reducing Risks from Uncontrolled Reentries of Rocket Bodies and Other Space Objects', *Journal of Space Safety Engineering*, 10.1 (2023), 1–6 https://doi.org/10.1016/j.jsse.2023.02.003

[110] A. Kupcu, 'Official Arbitration with Secure Cloud Storage Application', *The Computer Journal*, 58.4 (2015), 831–52 https://doi.org/10.1093/comjnl/bxt138

unresolved. Arbitration is widely used but has its limitations, especially when disputes involve politically or militarily sensitive issues. Arbitration is also inherently bilateral, focusing solely on the disputing parties and excluding other stakeholders who may have direct or indirect interests, including future generations and humanity as a whole. Although the PCA optional rules offer incremental improvements, they are insufficient to address the broader challenges of space-related disputes. In this context, Dubai's Court of Space emerges as an innovative and promising solution. Unlike traditional arbitration institutions, it provides specialized judges with expertise in space law, ensures transparency through publicly available decisions, and offers an expedited trial process. As a court, its decisions will set non-binding precedents, benefiting the international space community. While the court is not yet operational, its potential to address the diverse needs of the space sector positions it as a leading candidate for resolving future space disputes effectively and inclusively.

References

Adinolfi, Giovanna, 'Soft Law in International Investment Law and Arbitration', *The Italian Review of International and Comparative Law*, 1.1 (2021), 86–112 https://doi.org/10.1163/27725650-01010005

Aganaba, Timiebi, 'A Cosmopolitan Approach to International Law (CAIL) Reflection on the Space Development Experience of Africa', *Space Policy*, 69 (2024), 101638 https://doi.org/10.1016/j.spacepol.2024.101638

Aitken, Rob, 'Extractive Separations: A Polanyian Note on the International Investment Treaty Regime', *The Extractive Industries and Society*, 20 (2024), 101559 https://doi.org/10.1016/j.exis.2024.101559

Al-Sabah, Ruqaya S., and Sarah S. Al-enezi, 'Reducing Contract Disputes: A Comparative Analysis of FIDIC and GCC Standard General Conditions of Contract for Construction Projects', *Journal of Engineering Research*, 2024 https://doi.org/10.1016/j.jer.2024.09.015

Ansenberg, Uri, Nufar Avni, and Gillad Rosen, 'Exploring Real Estate Valuation Practices in an Informal Market', *Habitat International*, 147 (2024), 103069 https://doi.org/10.1016/j.habitatint.2024.103069

Argüello, Gabriela, 'Large-Scale Collective Action in the Arctic Ocean: The Role of International Organizations in Climate Governance', *Ocean & Coastal Management*, 211 (2021), 105706 https://doi.org/10.1016/j.ocecoaman.2021.105706

Asta, Gabriele, 'Double Degree of Jurisdiction in International Adjudication', *The Italian Review of International and Comparative Law*, 1.2 (2022), 471–78 https://doi.org/10.1163/27725650-01020016

Atri, Dimitra, Paulina Umansky, and Katepalli R. Sreenivasan, 'Sustainability as a Core Principle of Space and Planetary Exploration', *Space Policy*, 70 (2024), 101636 https://doi.org/10.1016/j.spacepol.2024.101636

Bace, Brianna, Yasir Gökce, and Unal Tatar, 'Law in Orbit: International Legal Perspectives on Cyberattacks Targeting Space Systems', *Telecommunications Policy*, 48.4 (2024), 102739 https://doi.org/10.1016/j.telpol.2024.102739

Bao, Kangyun, and Shenghua Lu, 'Judiciary-Driven Finance: Quasi-Experimental Evidence from Specialized Financial Adjudication Institutions in China', *International Review of Law and Economics*, 80 (2024), 106227 https://doi.org/10.1016/j.irle.2024.106227

Berthet, Maximilien, and Riccardo Corrado, 'Review and Comparison of Three Emerging Regional Space Agencies: The African Space Agency, the Arab Space Coordination Group, and the Latin American and Caribbean Space Agency', *Space Policy*, 68 (2024), 101624 https://doi.org/10.1016/j.spacepol.2024.101624

Borowitz, Mariel, Althea Noonan, and Reem El Ghazal, 'U.S. Strategic Interest in the Moon: An Assessment of Economic, National Security, and Geopolitical Drivers', *Space Policy*, 69 (2024), 101548 https://doi.org/10.1016/j.spacepol.2023.101548

Brada, Josef C., Chunda Chen, Jingyi Jia, Ali M. Kutan, and M. Fabricio Perez, 'Value Creation and Value Destruction in Investor-State Dispute Arbitration', *Journal of Multinational Financial Management*, 63 (2022), 100728 https://doi.org/10.1016/j.mulfin.2021.100728

Byers, Michael, Aaron Boley, and Ewan Wright, 'Letter to Space Agency Leaders on Reducing Risks from Uncontrolled Reentries of Rocket Bodies and Other Space Objects', *Journal of Space Safety Engineering*, 10.1 (2023), 1–6 https://doi.org/10.1016/j.jsse.2023.02.003

Capurso, Andrea, Paolo Marzioli, and Michela Boscia, 'Questions of Fault Liability: A Case Study Analysis of in-Orbit Collisions with Debris', *Journal of Space Safety Engineering*, 10.4 (2023), 439–46 https://doi.org/10.1016/j.jsse.2023.08.001

Chang, Yen-Chiang, Xiaonan Zhao, Anqi Jian, and Ying Tan, 'Frontier Issues in International Ocean Governance: Japan's Discharge of Nuclear Contaminated Water into the Sea', *Marine Pollution Bulletin*, 198 (2024), 115853 https://doi.org/10.1016/j.marpolbul.2023.115853

Chen, Xidi, and Qi Xu, 'Reflections on International Dispute Settlement Mechanisms for the Fukushima Contaminated Water Discharge', *Ocean & Coastal Management*, 226 (2022), 106278 https://doi.org/10.1016/j.ocecoaman.2022.106278

Chen, Zhijie, and Yun Zhao, 'Intellectual Property Protection in Outer Space: Conflict in Theory and Application in Practice', *Space Policy*, 61 (2022), 101484 https://doi.org/10.1016/j.spacepol.2022.101484

Chernykh, Irina, and Daniil Volodin, 'The Principle of International Cooperation and Sharing of Information Principle under International Space Law: Towards Synergy', *Space Policy*, 67 (2024), 101593 https://doi.org/10.1016/j.spacepol.2023.101593

Dey, Anish, and Jithin Jagadanandan, 'Unveiling the Realm of AI Governance in Outer Space and Its Importance in National Space Policy', *Acta Astronautica*, 228 (2025), 253–64 https://doi.org/10.1016/j.actaastro.2024.11.022

Du, HouYang, and Hang Guo, 'Establishment of Environmental Tribunals and Corporate Outward Investment Behaviour', *Finance Research Letters*, 67 (2024), 105795 https://doi.org/10.1016/j.frl.2024.105795

Fox, Sarah Jane, 'Policing Mining: In Outer-Space Greed and Domination vs. Peace and Equity a Governance for Humanity!', *Resources Policy*, 64 (2019), 101517 https://doi.org/10.1016/j.resourpol.2019.101517

Franckx, Erik, 'A Single Maritime Boundary: From UNCLOS III to Present-Day Developments', *Marine Policy*, 148 (2023), 105425 https://doi.org/10.1016/j.marpol.2022.105425

Frandsen, Hjalte Osborn, 'Looking for the Rules-of-the-Road of Outer Space: A Search for Basic Traffic Rules in Treaties, Guidelines and Standards', *Journal of Space Safety Engineering*, 9.2 (2022), 231–38 https://doi.org/10.1016/j.jsse.2022.02.002

Freyens, Benoit Pierre, and Xiaodong Gong, 'Judicial Arbitration of Unfair Dismissal Cases: The Role of Peer Effects', *International Review of Law and Economics*, 64 (2020), 105947 https://doi.org/10.1016/j.irle.2020.105947

Frodge, Ryan, and Daniel Murray, 'Space Data Integration', *Journal of Space Safety Engineering*, 9.2 (2022), 182–88 https://doi.org/10.1016/j.jsse.2022.02.015

Garcia-del-Real, Jose, and Manuel Alcaráz, 'Unlocking the Future of Space Resource Management through Satellite Remote Sensing and AI Integration', *Resources Policy*, 91 (2024), 104947 https://doi.org/10.1016/j.resourpol.2024.104947

García Ch., María Catalina, and Joyeeta Gupta, 'Environmental and Sociocultural Claims within Maritime Boundary Disputes', *Marine Policy*, 139 (2022), 105043 https://doi.org/10.1016/j.marpol.2022.105043

Graham, Thomas, Kathiravan Thangavel, and Anne-Sophie Martin, 'Navigating AI-Lien Terrain: Legal Liability for Artificial Intelligence in Outer Space', *Acta Astronautica*, 217 (2024), 197–207 https://doi.org/10.1016/j.actaastro.2024.01.039

Gullett, Warwick, 'The Contribution of the Law of the Sea Convention to Marine Environmental Protection: 40 Years of Shimmering Seas or High Hopes Dashed against Juridical Rocks?', *Marine Policy*, 149 (2023), 105498 https://doi.org/10.1016/j.marpol.2023.105498

Gupta, Mini, and Tommaso Sgobba, 'Convention on the Regulation of Near Space', *Journal of Space Safety Engineering*, 9.2 (2022), 129–31 https://doi.org/10.1016/j.jsse.2022.05.004

Han, Zenglin, Kaiping Jiang, Fei Peng, and Shuqin Li, 'The Philippines' Hedging Strategy against China in the South China Sea Dispute: Based on the Human-Ocean Regional System', *Marine Policy*, 151 (2023), 105578 https://doi.org/10.1016/j.marpol.2023.105578

Hassanali, Kahlil, 'Internationalization of EIA in a New Marine Biodiversity Agreement under the Law of the Sea Convention: A Proposal for a Tiered Approach to Review and Decision-Making', *Environmental Impact Assessment Review*, 87 (2021), 106554 https://doi.org/10.1016/j.eiar.2021.106554

Hertzfeld, Henry R., 'Unsolved Issues of Compliance with the Registration Convention', *Journal of Space Safety Engineering*, 8.3 (2021), 238–44 https://doi.org/10.1016/j.jsse.2021.05.004

Hook, Charlotte, Ewan Wright, Michael Byers, and Aaron Boley, 'Uncontrolled Reentries of Space Objects and Aviation Safety', *Acta Astronautica*, 222 (2024), 69–80 https://doi.org/10.1016/j.actaastro.2024.05.026

Hussain, Shahid, and Khurram Shahzad, 'India's Quest for "Global Space and Influence" through the "Outer Space" Domain', *Journal of Space Safety Engineering*, 10.3 (2023), 351–65 https://doi.org/10.1016/j.jsse.2023.05.004

Al Hyari, Omar Hisham, and Abdullah Rabee Al Ani, 'Post Award Arbitral Tribunal's Mandate under the UNCITRAL Model Law and National Laws Based Thereon', *Heliyon*, 7.7 (2021), e07556 https://doi.org/10.1016/j.heliyon.2021.e07556

Jaelani, Abdul Kadir, Resti Dian Luthviati, Ahmad Siboy, Sholahuddin Al Fatih, and Muhammad Jihadul Hayat, 'Artificial Intelligence Policy in Promoting Indonesian Tourism', *Volksgeist: Jurnal Ilmu Hukum Dan Konstitusi*, 2024, 109–37 https://doi.org/10.24090/volksgeist.v7i1.10623

Jakhu, Ram S., Bhupendra Jasani, and Jonathan C. McDowell, 'Critical Issues Related to Registration of Space Objects and Transparency of Space Activities', *Acta Astronautica*, 143 (2018), 406–20 https://doi.org/10.1016/j.actaastro.2017.11.042

Jiao, Hongwei, Wenjie Wang, and Youlin Shang, 'Outer Space Branch-Reduction-Bound Algorithm for Solving Generalized Affine Multiplicative Problems', *Journal of Computational and Applied Mathematics*, 419 (2023), 114784 https://doi.org/10.1016/j.cam.2022.114784

Kalantzi, Anastasia, 'Parallel Arbitral Proceedings: An Analysis of the Issue of Parallel Arbitrations in International Commercial Arbitration within the European Legal Space', *The Italian Review of International and Comparative Law*, 3.1 (2023), 1–27 https://doi.org/10.1163/27725650-03010001

Kamiński, Tomasz, and Rafał Szewczyk, 'The Coastal State Obligation Not to Impede the Laying or Maintenance of Submarine Pipelines on the Continental Shelf According to United Nations Convention on the Law of the Sea', *Marine Policy*, 143 (2022), 105086 https://doi.org/10.1016/j.marpol.2022.105086

Karjoko, Lego, Zaidah Nur Rosidah, and I Gusti Ayu Ketut Rahmi Handayani, 'Refleksi Paradigma Ilmu Pengetahuan Bagi Pembangunan Hukum Pengadaan Tanah', *BESTUUR*, 7.2 (2020), 1 https://doi.org/10.20961/bestuur.v7i1.42694

Kojima, Ayami, Daniel García Yárnoz, and Simonetta Di Pippo, 'Access to Space: A New Approach by the United Nations Office for Outer Space Affairs', *Acta Astronautica*, 152 (2018), 201–7 https://doi.org/10.1016/j.actaastro.2018.07.041

Kojima, Chie, 'Integration of General Principles of International Environmental Law into the Law of the Sea: Assessment and Challenges', *Marine Policy*, 149 (2023), 105497 https://doi.org/10.1016/j.marpol.2023.105497

Kong, Dejian, 'International Space Law for GNSS Civil Liability: A Possible Solution?', *Space Policy*, 48 (2019), 76–86 https://doi.org/10.1016/j.spacepol.2019.01.001

Kupcu, A., 'Official Arbitration with Secure Cloud Storage Application', *The Computer Journal*, 58.4 (2015), 831–52 https://doi.org/10.1093/comjnl/bxt138

Kuppuswamy, Chamundeeswari, and Daria Boklan, 'Beyond Free Trade in Raw Materials: Reconciling International Trade Rules with Planetary Boundaries', *The Extractive Industries and Society*, 19 (2024), 101481 https://doi.org/10.1016/j.exis.2024.101481

Kyriakopoulos, Georgios (George) D., 'On the Settlement of Space and International Telecommunications Related Disputes', *Acta Astronautica*, 211 (2023), 655–63 https://doi.org/10.1016/j.actaastro.2023.07.004

Li, Du, 'Cyber-Attacks on Space Activities: Revisiting the Responsibility Regime of Article VI of the Outer Space Treaty', *Space Policy*, 63 (2023), 101522 https://doi.org/10.1016/j.spacepol.2022.101522

Li, Kaigeng, Hong Wu, and Yupeng Dong, 'Copyright Protection during the Training Stage of Generative AI: Industry-Oriented U.S. Law, Rights-Oriented EU Law, and Fair Remuneration Rights for Generative AI Training under the UN's International Governance Regime for AI', *Computer Law & Security Review*, 55 (2024), 106056 https://doi.org/10.1016/j.clsr.2024.106056

Li, Xiaodao, 'Comparing the Power Resources Critical to International Rulemaking in Outer Space: China and the United States', *Advances in Space Research*, 72.6 (2023), 2297–2312 https://doi.org/10.1016/j.asr.2023.05.038

Long, Jie, and Chuying Huang, 'Obligations and Liabilities Concerning the Active Removal of Foreign Space Debris: A Global Governance Perspective', *Acta Astronautica*, 222 (2024), 422–35 https://doi.org/10.1016/j.actaastro.2024.06.036

Lucas-Rhimbassen, Maria, 'The COST of Joining Legal Forces on a Celestial Body of Law and Beyond: Anticipating Future Clashes between Corpus Juris Spatialis, Lex Mercatoria, Antitrust and Ethics', *Space Policy*, 59 (2022), 101445 https://doi.org/10.1016/j.spacepol.2021.101445

MADANI, Zia, 'Unpacking Inclusivity of the Antarctic Treaty System amidst Contemporary Challenges', *Polar Science*, 2024, 101144 https://doi.org/10.1016/j.polar.2024.101144

Mallowan, Lucas, Lucien Rapp, and Maria Topka, 'Reinventing Treaty Compliant "'Safety Zones'" in the Context of Space Sustainability', *Journal of Space Safety Engineering*, 8.2 (2021), 155–66 https://doi.org/10.1016/j.jsse.2021.05.001

Mammadzada, Aygun, 'Arbitral Anti-Suit Measures: Implications of Mutual Trust', *The Italian Review of International and Comparative Law*, 3.1 (2023), 28–60 https://doi.org/10.1163/27725650-03010002

Maréchal, Matthieu, 'A Sufficient Condition for Metric Subregularity of Set-Valued Mappings between Asplund Spaces Based on an Outer-Coderivative-like Variational

Tool', *Heliyon*, 9.10 (2023), e20314 https://doi.org/10.1016/j.heliyon.2023.e20314

Marino, Alessandra, and Thomas Cheney, 'Centring Environmentalism in Space Governance: Interrogating Dominance and Authority Through a Critical Legal Geography of Outer Space', *Space Policy*, 63 (2023), 101521 https://doi.org/10.1016/j.spacepol.2022.101521

Martinez, Peter, Peter Jankowitsch, Kai-Uwe Schrogl, Simonetta Di Pippo, and Yukiko Okumura, 'Reflections on the 50th Anniversary of the Outer Space Treaty, UNISPACE+50, and Prospects for the Future of Global Space Governance', *Space Policy*, 47 (2019), 28–33 https://doi.org/10.1016/j.spacepol.2018.05.003

Melamed, Avishai, Adi Rao, Olaf de Rohan Willner, and Sarah Kreps, 'Going to Outer Space with New Space: The Rise and Consequences of Evolving Public-Private Partnerships', *Space Policy*, 68 (2024), 101626 https://doi.org/10.1016/j.spacepol.2024.101626

Milo, Caterina, 'Tackling Lacunae in International Courts and Tribunals' Procedure: The Role of External Precedent', *The Italian Review of International and Comparative Law*, 2022, 1–24 https://doi.org/10.1163/27725650-02020006

Mingozzi, Pierre Clément, 'The Contribution of Itlos to Fight Climate Change: Prospects and Challenges of the Cosis Request for an Advisory Opinion', *The Italian Review of International and Comparative Law*, 3.2 (2023), 306–24 https://doi.org/10.1163/27725650-03020008

Neal, Clive R., Antonino Salmeri, Angel Abbud-Madrid, James D. Carpenter, Anthony Colaprete, Karl A. Hibbitts, and others, 'The Moon Needs an International Lunar Resource Prospecting Campaign', *Acta Astronautica*, 214 (2024), 737–47 https://doi.org/10.1016/j.actaastro.2023.11.017

Okyay, N. Kansu, 'The Applicability of the Brussels I Bis Regulation to Hybrid Dispute Resolution Clauses', *The Italian Review of International and Comparative Law*, 3.1 (2023), 61–86 https://doi.org/10.1163/27725650-03010003

Pace, Scott, 'U.S. Space Policy and Theories of International Relations: The Case for Analytical Eclecticism', *Space Policy*, 65 (2023), 101538 https://doi.org/10.1016/j.spacepol.2022.101538

Park, Se Mi, 'Commercial Arbitration Regime and Sourcing Decision', *International Review of Law and Economics*, 78 (2024), 106195 https://doi.org/10.1016/j.irle.2024.106195

Pelton, Joseph N., 'Creation of a Comprehensive Global Space Risk Scale (SRS)', *Journal of Space Safety Engineering*, 5.1 (2018), 77–81 https://doi.org/10.1016/j.jsse.2017.11.005

Petturiti, Davide, Gabriele Stabile, and Barbara Vantaggi, 'Addressing Ambiguity in Randomized Reinsurance Stop-Loss Treaties Using Belief Functions', *International Journal of Approximate Reasoning*, 161 (2023), 108986 https://doi.org/10.1016/j.ijar.2023.108986

Qian, Jiangtao, Kangjie Sun, and Yen-Chiang Chang, 'The Impact of the ITLOS Climate Change Advisory Opinion on the Development of International Law', *Marine Policy*,

170 (2024), 106406 https://doi.org/10.1016/j.marpol.2024.106406

Qisong, He, 'The Order of Law-Based vs. Rules-Based: The Competition in Space Order between China and the United States', *Advances in Space Research*, 73.1 (2024), 1006–18 https://doi.org/10.1016/j.asr.2023.10.020

Rapp, Lucien, Maria Topka, and Lucas Mallowan, 'Which Jurisdiction for Private In-Space Assembled Autonomous Platforms?', *Space Policy*, 56 (2021), 101413 https://doi.org/10.1016/j.spacepol.2021.101413

Ratnawati, Elfrida, Vience Ratna Multi Wijaya, Meta Indah Budhianti, and Bobur Baxtishodovich Sobirov, 'Is the Master Civil Liable Based on Sea Freight Arrangements in Indonesia?', *Journal of Human Rights, Culture and Legal System*, 4.1 (2024), 209–36 https://doi.org/10.53955/jhcls.v4i1.194

Rubin, Lawrence, 'A Middle East Space Race? Motivations, Trajectories, and Regional Politics', *Space Policy*, 69 (2024), 101608 https://doi.org/10.1016/j.spacepol.2023.101608

Ruoppo, Roberto, 'Common Features of the Right to Property and International Investments: Evidence from the Use of ECtHR Case-Law in Investment Tribunals' Decisions', *The Italian Review of International and Comparative Law*, 2022, 1–23 https://doi.org/10.1163/27725650-02020007

Salins, Sampath Suranjan, Sreejith Sanal Kumar, Antony John Jose Thommana, Vivian Christo Vincent, Ana Tejero-González, and Shiva Kumar, 'Performance Characterization of an Adaptive-Controlled Air Handling Unit to Achieve Thermal Comfort in Dubai Climate', *Energy*, 273 (2023), 127186 https://doi.org/10.1016/j.energy.2023.127186

Sapriani, Sapriani, Reza Octavia Kusumaningtyas, and Khalid Eltayeb Elfaki, 'Strengthening Blue Economy Policy to Achieve Sustainable Fisheries', *Journal of Sustainable Development and Regulatory Issues (JSDERI)*, 2.1 (2024), 1–19 https://doi.org/10.53955/jsderi.v2i1.23

Seatzu, Francesco, and Paolo Vargiu, 'Three Views of a Secret: Missed Opportunities in the Echr's Recent Case-Law on International Commercial Arbitration', *The Italian Review of International and Comparative Law*, 1.2 (2022), 203–23 https://doi.org/10.1163/27725650-01020001

Semerád, Pavel, 'Asteroid Mining Tax as a Tool to Keep Peace in Outer Space', *Space Policy*, 65 (2023), 101555 https://doi.org/10.1016/j.spacepol.2023.101555

Sgobba, Tommaso, 'Assured Debris Removal: Proposal for an Operational and Regulatory Framework', *Journal of Space Safety Engineering*, 7.1 (2020), 1–2 https://doi.org/10.1016/j.jsse.2020.02.005

Sgobba, Tommaso, and Mini Gupta, 'Proposing an International Convention for an Intermediate Region between Airspace and Outer Space Instead of the "Karman Line"', *Journal of Space Safety Engineering*, 9.2 (2022), 127–28 https://doi.org/10.1016/j.jsse.2022.05.003

Shi, Xinxiang, 'Distinction between Law Enforcement Activity and Military Activity in

Article 298(1)(b) of UNCLOS: Commentary on Recent International Decisions', *Marine Policy*, 167 (2024), 106287 https://doi.org/10.1016/j.marpol.2024.106287

Simone, Nevan, Brian C. Weeden, and Moriba K. Jah, 'Introducing the Satellite Dashboard: A Tool for Enhancing the Visibility of Rendezvous and Proximity Operations in Geosynchronous Orbit', *Journal of Space Safety Engineering*, 9.2 (2022), 251–56 https://doi.org/10.1016/j.jsse.2022.01.002

Singh, Balbir, Phillip Anz-Meador, Akira Kato, Timothy Maclay, Annamaria Nassisi, Francesco Santoro, and others, 'An Insight on Technical Regulations for New Activities in Space', *Acta Astronautica*, 225 (2024), 707–18 https://doi.org/10.1016/j.actaastro.2024.09.056

Sironi De Gregorio, Francesca, 'Proving Environmental Harm in Inter-State Litigation: Challenges and Evolving Strategies', *The Italian Review of International and Comparative Law*, 3.2 (2023), 348–66 https://doi.org/10.1163/27725650-03020010

Su, Jinyuan, and Jinxuan Li, 'Toward an International Legal Framework for the Protection of Outer Space Heritage', *Space Policy*, 2024, 101625 https://doi.org/10.1016/j.spacepol.2024.101625

Svec, Martin, 'Outer Space, an Area Recognised as Res Communis Omnium: Limits of National Space Mining Law', *Space Policy*, 60 (2022), 101473 https://doi.org/10.1016/j.spacepol.2021.101473

Teichmann, Fabian, Sonia Boticiu, and Bruno S. Sergi, 'The Risk of Abuse of Arbitration Proceedings in Jurisdictions Where Corruption Is Pervasive', *Journal of Economic Criminology*, 2 (2023), 100032 https://doi.org/10.1016/j.jeconc.2023.100032

Tilloy, Julio Alberto, 'The Itlos Jurisprudence Regarding the Procedural Obligation to Conduct an Environmental Impact Assessment and Its Significance for Deep Seabed Mining', *The Italian Review of International and Comparative Law*, 3.2 (2023), 325–47 https://doi.org/10.1163/27725650-03020009

Trisolini, Mirko, Hugh G. Lewis, and Camilla Colombo, 'Constrained Optimisation of Preliminary Spacecraft Configurations under the Design-for-Demise Paradigm', *Journal of Space Safety Engineering*, 8.1 (2021), 63–74 https://doi.org/10.1016/j.jsse.2021.01.005

Türker, Yavuz Özhan, 'The Impact of the Right of Access to Information on Sustainable Development Goals under the Aarhus Convention', *Journal of Environmental Management*, 370 (2024), 122918 https://doi.org/10.1016/j.jenvman.2024.122918

Vidal, Florian, and Roman Privalov, 'Russia in Outer Space: A Shrinking Space Power in the Era of Global Change', *Space Policy*, 69 (2024), 101579 https://doi.org/10.1016/j.spacepol.2023.101579

Wakimoto, Takuya, 'Ensuring the Safety of Commercial Space Transportation through Standardization: Implications of the Chicago Convention and ICAO Standards', *Space Policy*, 49 (2019), 101326 https://doi.org/10.1016/j.spacepol.2019.05.004

Wang, Guoyu, and Xinyi Huang, 'On the Common Heritage of Mankind Principle in Space', *Acta Astronautica*, 211 (2023), 926–38

https://doi.org/10.1016/j.actaastro.2023.07.002

Wang, Qiuwen, 'Maritime Law Enforcement Concerning Offshore Energy Platforms: Navigating International Law Constraints and Challenges', *Marine Policy*, 170 (2024), 106370 https://doi.org/10.1016/j.marpol.2024.106370

Wang, Weishan, and Claudio Aporta, 'Arctic Marine Shipping Development and Governance in Canada: A Historical Overview', *Marine Policy*, 160 (2024), 105958 https://doi.org/10.1016/j.marpol.2023.105958

Wu, Xiaodan, 'The International Lunar Research Station: China's New Era of Space Cooperation and Its New Role in the Space Legal Order', *Space Policy*, 65 (2023), 101537 https://doi.org/10.1016/j.spacepol.2022.101537

Yan, Yongliang, 'Anti-Weaponization of Outer Space for Maintaining Long-Term Sustainability of Outer Space Activities', *Space Policy*, 63 (2023), 101519 https://doi.org/10.1016/j.spacepol.2022.101519

Ye, Ningyao, and Zeyu Zhao, 'The Reform of Consumer Protection in Mobile Payment Services in China: Legislation, Regulation, and Dispute Resolution', *Computer Law & Security Review*, 54 (2024), 106007 https://doi.org/10.1016/j.clsr.2024.106007

Yu, Huan, 'The Development of China's Extraterritorial Mineral Resources Exploration and Exploitation in the Deep Seabed and Outer Space: An Evaluation from Policy and Legal Perspectives', *Resources Policy*, 93 (2024), 105060 https://doi.org/10.1016/j.resourpol.2024.105060

Yu, Huan, and Mingyan Nie, 'Acceding to the Moon Agreement to Acquire Legal Certainty: An Optional Solution for China in the New Era of Lunar Exploration and Exploitation', *Acta Astronautica*, 212 (2023), 665–71 https://doi.org/10.1016/j.actaastro.2023.08.035

Zerbian, Tanya, Ana Moragues-Faus, Daniel López-García, and Lidia García-García, 'Territorialising Knowledge-Policy Interfaces: Lessons from Urban Food Governance Spaces', *Environmental Science & Policy*, 161 (2024), 103883 https://doi.org/10.1016/j.envsci.2024.103883

Zhao, Yun, and Shengli Jiang, 'Armed Conflict in Outer Space: Legal Concept, Practice and Future Regulatory Regime', *Space Policy*, 48 (2019), 50–59 https://doi.org/10.1016/j.spacepol.2019.01.004

Zhu, Jiaxin, and Qi Xu, 'Reflections on the Settlement of Fisheries Disputes between the EU-UK in the Post-Brexit Era: Lessons for China's Fishery Enforcement Disputes Settlement', *Marine Policy*, 169 (2024), 106365 https://doi.org/10.1016/j.marpol.2024.106365

Ziemblicki, Bartosz, and Yevgeniya Oralova, 'Private Entities in Outer Space Activities: Liability Regime Reconsidered', *Space Policy*, 56 (2021), 101427 https://doi.org/10.1016/j.spacepol.2021.101427

Zugliani, Niccolò, 'A Role for Precedent in the Determination of the Standard of Review Applicable by Investment Arbitral Tribunals? A Case Study of Ect-Based Energy

Disputes Against Spain', *The Italian Review of International and Comparative Law*, 2022, 1–20 https://doi.org/10.1163/27725650-02020008

de Zwart, Melissa, Stacey Henderson, and Michelle Neumann, 'Space Resource Activities and the Evolution of International Space Law', *Acta Astronautica*, 211 (2023), 155–62 https://doi.org/10.1016/j.actaastro.2023.06.009