

Outer Space Law: Legal Policy and Practice by Yanal Abul Failat and Anél Ferreira-Snyman (Consulting Editors)

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The second edition of *Outer Space Law: Legal Policy and Practice* could not have arrived at a more opportune moment. A no lesser space law expert than Professor Mason-Zwaan highlights in the foreword that since the publication of the first edition in 2017, the commercialisation of outer space has further intensified and the impact of so-called ‘NewSpace’ has grown exponentially. New participants (other than states), debates, policies and businesses have come to the fore, plus the Guidelines on the Long-term Sustainability of Outer Space Activities of the Committee on the Peaceful Uses of Outer Space¹ (UNCOPUOUS) and the National Aeronautics and Space Administration’s (NASA) Artemis Accords² for cooperation in the exploration and use of the Moon and other celestial bodies. At the time of writing, twenty-one nations have already signed up to the multilateral Artemis programme to return to the Moon, demonstrating a clear future intention by traditional and new space-faring countries:³ Australia, Bahrain, Brazil, Canada, Colombia, France, Israel, Italy, Japan, the Republic of Korea, Luxembourg, Mexico, New Zealand, Poland, Romania, Saudi Arabia, Singapore, Ukraine, the United Arab Emirates (UAE), the United Kingdom (UK) and the United States of America (USA). The recent twenty-one Guidelines on the Long-Term Sustainability of Outer Space Activities may well turn out to be one of the most important soft law instruments concerning outer space. Fittingly, the consulting editors in their Preface to this second edition quoted the US teacher and astronaut Christa McAuliffe: ‘Space is for everybody. It’s not just for a few people in science or math, or for a select group of astronauts. That’s our new frontier out there, and it’s everybody’s business to know about space.’

The South African legal community may take pride in the increased South African presence in this niche field. Not only were the Long-Term Sustainability Guidelines negotiated under the brilliant chairmanship of Peter Martinez, but academics Gerrit

Ferreira and Wian Erlank joined consulting editor Anél Ferreira-Snyman in providing chapters.

Again, contributions are provided from a pleasing combination of space venturers, practitioners, and academics. As usual there are the traditional and updated outer space topics on international and domestic law governing outer space activities, delimitation and earth orbits, military activities, licencing private activities, property and ownership, exploitation of natural resources, regulation of remote sensing activities and space tourism and artificial satellites, intellectual property law (in the context of climate change), environmental responsibility for space debris, cyber operations, evidence from space in cases before international courts, international trade aspects of outer space activities and dispute resolution. Furthermore, this second edition covers contemporary NewSpace topics such as universe exploration and colonisation, planetary protection, regulation of satellite systems and of satellite constellations, financing of space activities, and the extra-territorial application of human rights instruments in outer space settlements.

The basics of outer space law subject matter has been updated: The Secure World Foundation's Johnson provides a breakdown on the international law governing outer space activities, describes the five outer space treaties developed within the United Nations (UN) system, and also the most important soft law instruments and recently formulated international norms of behaviour. Yun Zhao describes national law governing outer space activities as an indication that a state is determined to honour its obligations under the international regime and is serious about implementing these by laying down detailed rules. National legislation has filled the legal vacuum created after the UN proved incapable of acting on specific issues of privatisation and commercialisation not addressed in the five outer space treaties. Regulation is not only a state's right, but also an enabler, for example the US Space Resources Exploration and Utilization Act of 2015, the Luxembourgian Law of the Exploration and Use of Space Resources in 2017 and the UK's Space Industry Act 2018.

It is in the field of regulation that this textbook becomes quite comprehensive. Newman examines the key legal and organisational mechanisms by which the regulation of satellite activity is supervised. Unfortunately, regulatory issues did not receive the same attention as the technical factors and must be found in hard and soft law and national space legislation and licensing, plus the International Telecommunication Union's (ITU) radio frequency and orbital slot management. Micro-satellites such as CubeSats, which are easy to manufacture, allow new actors to access space but might have reliability issues that may pose a danger to other space objects. The Outer Space Treaty, Registration and Liability Conventions, and the Rescue and Return Agreement, provide a package deal governing the initial authorisation, registration, ongoing supervision, liability and if required, the return of space objects. In terms of national regulation, the state will bear responsibility for the launch, registration and control of a state project, while a commercial entity will require a licensing scheme via primary legislation. Future

debris management is handled by the environmental obligation in Article IX of the Outer Space Treaty, the UN soft-law Guidelines on Debris Mitigating (2007) and Long-term Sustainability of Outer Space (2019). The author calls for the Long-term Sustainability Guidelines to be embedded in national laws and regulation. He also examines the restructuring of the International Telecommunications Satellite Organization (INTELSAT), International Maritime Satellite Organization (INMARSAT), and European Telecommunications Satellite Organization (EUTELSAT) from intergovernmental organisations to international space organisations.

Failat has updated his useful comparison table of licensing private outer space activities regimes, their indemnification and insurance requirements, and scope of application or jurisdiction, by adding the regimes of Finland, Indonesia, Luxembourg, New Zealand, Nigeria, Philippines, and Portugal to that of Algeria, Argentina, Austria, Belarus, Belgium, Brazil, Canada, Chile, China Colombia, Denmark, France, Germany, Hong Kong, Ireland, Italy, Japan, Kazakhstan, Netherlands, Norway, Russia, South Africa, South Korea, Spain, Swede, UAE and the USA. Australia, the UK, and Ukraine's updated legislation is also analysed. It is noticeable that some major spacefaring states, like China, still lack proper legislation, which creates regulatory uncertainty. A new section discusses the authorisation and supervision processes. The general conditions of licences in the various jurisdictions have also been updated, as are have the specific liability and indemnification requirements. Interestingly, in Australia, accepting direct fiscal responsibility is now acceptable, and may even be waived if the space activity is in the public interest. As more states and players are getting involved in the space arena, many states have recently established space agencies and laws to regulate and develop space-related activities. This is in line with the international responsibility of states for private activities in terms of the Outer Space Treaty. National legal frameworks now function in conjunction with international laws to protect states and private actors.

According to Golda and De Maestri, space remote sensing is regulated by a single international legal instrument, the 1986 United Nations General Assembly (UNGA) Resolution on Principles relating to Remote Sensing of the Earth from outer Space. As remote sensing trends have moved from state ownership to widespread accessibility to data, the legal regime governing remote sensing revealed many gaps, with states having had to adopt their own special rules regarding space activities. Only a small number have opted to regulate remote sensing and introduce a special regime regarding the dissemination of data derived from space infrastructures, and examples such as the USA among the common law systems and Germany among the civil law systems are discussed. Several international organisations tried to build voluntary commitments via soft law, for example the World Meteorological Organisation's resolution on policy and practice for the exchange of meteorological and related data calling for free and unrestricted international exchange of information to prevent and manage natural disasters, and the French Space Agency's Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters.

The Group on Earth Observation (GEO) subsequently started the project to build a Global Earth Observation System of Systems (GEOSS).

The authors also consider licence conditions for satellite imagery and international principles of data dissemination, including a detailed discussion of the EU Data Dissemination policy and the practice in concluding satellite imagery contracts and Copernicus licence conditions, and satellite images as evidence before courts. Napier & Newman's precis on the regulation of satellites' constellations underlines the international liability of states for the actions of their mega-satellite companies from both operational and environmental perspectives, via the outer space treaties and the ITU. They highlight the problems caused by these constellations for optical- and radio astronomy, and the apparent lack of rules both nationally and internationally. The absence of an internationally agreed definition for a satellite constellation is circumvented by suggesting it has multiple numbers of replicated satellites which perform the same function, the whole system of which can continue to operate, should one or more of the individual satellites cease to function. Since the Outer Space Treaty, Registration Convention and UNGA resolution 62/101 provide no direct mandated requirement to provide information on whether a space object is operating as a single isolated item or as part of a constellation. They suggest more transparency, and an obligation to identify membership of a constellation by providing information on the orbital structure and the operating parameters. They applaud the ITU's 'milestone approach' that assists the Master International Frequency Register (MIRF) to reasonably reflect the actual deployment of non-GSO satellite systems in specific radio frequency bands and services. However, there is no bespoke government mechanism for dealing with the deployment of large numbers of satellites, and there is nothing to stop states from licensing these large numbers to further their commercial conditions. Quite correctly, they call for more international coordination and holistic thinking to address the finite resource of the radio spectrum.

A useful addition is Tiarks's discussion on the legal regulation of Global Navigation Satellite Systems (GNSS), which provide positioning, navigation and timing (PNT) services, and which have their origin in military use, but today serve as a vital enabler of many civil applications. The space-based component consists of a constellation of satellites transmitting PNT data, and the ground-based component synchronises that data and ensures the accuracy of the system. The four operational GNSS services are GPS-operated by the US Space Force, Russia's GLONASS, China's BeiDou, and the EU's Galileo, which are supported by regional and augmentation systems. The increasingly crowded radio frequency spectrum heightens the risk of interference of GNSS signals, with resultant widespread disruption and risk to life. The general legal regime relating to GNSS is made of generally applicable space law and related national law. However, damage resulting from radio interference caused by GNSS signals is unlikely to fall within the Liability Convention scope, although it could fall under Article I Outer Space Treaty (State authorisation and continuous supervision) or tort and

contract law. This may be supplemented by natural and soft law mechanisms aimed at cooperation and coordination.

Bittencourt again tackles the fifty-year-old, and still unresolved question on the delimitation of outer space and earth orbits. A legal frontier, still undelimited, exists between territorial airspace and under national control and jurisdiction, and outer space where no claim of sovereignty is recognised. This brings to the fore considerations about the vertical limit of state sovereignty. Few topics deserve more attention from the international community, but decades of deliberation in the UN have failed to gather enough political support around a common multilateral solution. Eventually, in many instances, this has led to unilateral domestic delimitation. His analysis of the main schools of thoughts, spatialists versus functionalists, is useful for the uninitiated. He proposes that the border between airspace and outer space should be fixed at an arbitrary limit of 100 kilometres of altitude from mean sea level and established by international instrument.

Delimitation again crops up in the consulting editors' update of their detailed examination of the regulation of space tourism. This innovative industry is still in need of a suitable legal framework to regulate its activities. They investigate the main issues that will have an impact on whether outer space law is applicable, namely defining what a 'space tourist' is, and the delimitation of outer space. As yet, no legal definition and status pertaining to a 'space tourist' exists, as there were no spacecraft passengers when the outer space treaties were drafted. The US now employs the terms 'crew', 'spaceflight participants' and 'government astronaut,' which contrast with the terms utilised in the outer space treaties such as 'astronaut', 'personnel of a spacecraft', or 'envoys of mankind.' Clarification on these issues is quite important, as it is currently not clear in terms of the 1968 Rescue Agreement whether states have a duty to rescue space tourists as passengers (as opposed to astronauts and personnel) on a spacecraft, whether visitors to the International Space Station (ISS) enjoy the special standing and protection afforded to astronauts, and whether the duty to rescue applies only to state-sponsored missions or to commercial spaceflights as well. To answer such questions, the editors discuss the training requirements of space tourists, how high a person must be in a space vehicle to be considered an astronaut, selection requirements for astronauts, regulation under the Intergovernmental Agreement on the International Space Station, plus the Memorandum of Understanding (MOU) between NASA and the Russian Space Agency, and regulation under USA domestic law.

The editors also discuss the thorny issue of liability under the Outer Space Treaty and the Liability Convention, and the applicability of treaty concepts under parallel regimes found in domestic law such as the cross-waiver of liability applicable to the ISS and the need for insurance. They conclude that clear international legal rules relating to space tourism, whether by single binding treaty or soft law instruments, must be formulated, with standards set for the authorisation and supervision of these activities, and the balancing of the interests of states, passengers, and private actors. They advise that it is

imperative that an international dialogue on space tourism be facilitated under the auspices of UNCOPUOS to address such legal challenges.

Ferreira-Snyman has updated the issue of military activities in outer space by specific reference to the latest Indian and Russian anti-satellites missile tests (ASAT), and the creation of several space commands, which indicate that states are increasingly viewing outer space as a separate military domain. The basic problem remains that most space assets have the potential to be used for military purposes, and the distinction between military and non-military uses of space is becoming increasingly blurred. The question remains whether the military use of space equipment is contrary to the requirement of Article IV of the Outer Space Treaty, in that outer space is to be used exclusively for peaceful purposes. She investigates the legal challenges flowing from Article IV, namely the meanings of 'peaceful purposes' and 'space weapons', and the issue of militarisation versus weaponisation. After an exposition on recent inconclusive UNCOPUOS debates on this topic, she concludes that the Outer Space Treaty cannot adequately deal with the current issues relating to the military uses of outer space. She criticises the lack of coordination in relation to outer space arms control initiatives in the UN system and pleads that an international dialogue on the issue be facilitated under the auspices of a consolidated forum, to address the legal uncertainties that may impair the peaceful uses of outer space. As an interim measure, soft law guidelines should be developed to provide a framework for an eventually consolidated and binding legal instrument relating to the use of outer space.

Dinniss examines the legal framework governing cyber operations in outer space and which may originate from national space commands. This consists of a mix of space law, general public international law, international telecommunications law, and domestic and international criminal laws dealing with cybercrime. The legal regulation of cyber operations in relation to space activities is largely unexplored, as the relatively modern field of outer space law simply did not envisage the clandestine ability of malicious operators to affect physically the space objects of a launching state. This chapter flags the gaps in the legal framework governing such activities and uncertainties. The author discusses liability for damage caused to objects on Earth or to aircraft in flight, and damage caused to a space object elsewhere than on Earth or to a person or property on board.

Not surprisingly, issues of ownership in outer space are being re-addressed. Erlank's chapter on property and ownership in outer space utilises a fictional orbiting space hotel and a mining base on the Moon or Mars, as examples of combining space tourism, mining of asteroids and construction in outer space. He concludes that property rights in outer space need to be re-evaluated and proposes a radical approach to the current debate, because of new developments and the commercialisation of outer space activities, celestial objects should, in certain instances, be recognised as *res in commercium* and as such capable of being owned by an individual, national, company

or mankind in general. Such an object must be impersonal, tangible, independent and susceptible to control by and of use to humankind.

De Man reworks his chapter on the exploitation of natural resources in outer space. The economic feasibility of exploiting space resources cannot be ignored. Some economic considerations of space mining with an immediate legal impact relate to the physical characteristics of the natural resource being exploited, depending on its classification as scarce, depletable or renewable. The effect of the Outer Space Treaty is that every actor in outer space must consider that all other states and their nationals have the same freedom to engage in spacefaring activities or exploration and use. Space stations, bases and other installations are permitted as long as they are not inaccessible to others. However, the establishment of exclusive economic sites for the purpose of mining natural resources may be limited. The exclusion of all property rights in outer space clashes with the freedom to use natural resources. Resource exploitation is compared with resource appropriation: Although 'exploitation' is not mentioned *per se* in the Outer Space Treaty, 'use' is defined to include exploitation, and the crucial question will then be: When does exploitation become appropriation, and can one engage in asteroid mining without appropriation? De Man also explained the difference between *in situ* resource utilisation (ISRU) and other forms of exploitation in the context of asteroid mining. The recent legislative developments in the UAE and Luxembourg on space resource exploitation, and the UNCOPUOS deliberations under the agenda item 'General Exchange of views on potential legal models for activities in exploration, exploitation and utilization of space resources,' are discussed. The Artemis Accords are criticised as having the potential to create exclusive economic zones and potentially affecting the free access principle. In the end, asteroid mining will be legal, should the following key rules be considered: Mining activities should not interfere with the authorised activities of other space actors, may not result in a substantial reduction of a particular resource to deprive others from undertaking comparable mining activities, and the mining sites should be clearly indicated on the plans and identify the legal purpose of the exploitation.

On another topic, Pecujlic in her chapter on intellectual property in the context of climate change, considers climate as a global commons and climate change as a global problem to be tackled in terms of international environmental law. Outer space is recognised in international law as one of the four domains requiring global governance for the benefit of mankind. Since the Paris Agreement does not create a legal basis for gaining access to space technology in combatting climate change, does the international space law regime sufficiently supports global access to space technology?

Satellites gather an enormous collection of essential climate variables (ECV) data over time. Both NASA and ESA have introduced open data access policies, but there remains the finding of technical solutions for storing, processing, and sharing. Intellectual property laws are applicable in outer space, but the main aim of the Outer Space Treaty is international cooperation. The technologies aimed at mitigating or monitoring

pollution cannot be transferred to developing countries owing to the granting of Western and Japanese monopoly patents as well as the Agreement on Trade-Related Aspects of Intellectual Property rights (TRIPS Agreement) that has not efficiently facilitated the transfer of technology. Another example is the South African and Indian October 2020 request to the World Health Organisation (WHO) to allow members to waive patents related to COVID-19 vaccines. The international space community tried to find a global solution for technology transfer relating to climate change, but these attempts generally failed, with few transfers taking place, because they were too complex and the licences too costly. She suggests a project-based approach to transfer technology, which would not require consensus from all UNCOPUOS member states and would only be applicable to the relevant States involved. An ISS Intergovernmental Agreement-type (IGA) three-tier structure should be used which would entail an umbrella agreement on the legal issues, followed by MOUs setting out more practical details on how to develop the project, and finally MOU implementation agreements. Therefore, a project-based, small-scale and regional solution among countries that share similar interests, is proposed.

Kimigiar, Klaui, McCarthy and Powell's update of the international trade aspects of outer space activities includes a new section on national security and investment review, the UK's domestic legislation since Brexit and several handy case studies. International trade laws and regulations affect many outer space activities. Supply chain, sourcing and vendor and customer decisions cannot be made without reference to the export control laws that regulate technology and hardware flow between companies, such as customs duties, taxes and requirements involving relevant countries. Information technology (IT) network structures and access controls must be made with expert control considerations in mind. The authors analyse key international trade regulatory areas, focusing on export and import controls, and sanctions, in particular dual-use and military items regulations. This highlights the need for integrating trade compliance into business planning, with the following core elements required by regulators and enforcement agencies: Management commitment, written policies and procedures, training, record keeping, monitoring and auditing.

The economics of space activities regarding financing is analysed by Luinaud, Ricard and Scatteia. The US\$371 billion space market is driven by a growing demand from the public sector and institutional players, and the increasing commercial need for broadband connectivity, rising demand for situational awareness and new analytics assets promising insights from space data. Although there is a drift towards greater private investor involvement, investments in the space sector can be discouraging for investors due to the lengthy time spans required before equity break-even. Emerging new finance mechanisms are public institutions increasingly adapting a private sector-inspired approach, crowdfunding, and special-purpose acquisition companies. The authors stress that financing of space activities must also comply with financial regulations and corporate law. A proper regulatory framework for financing space activities will have several components attractive to investors such as efficient

procurement rules and a proper protection of creditors linked to bankruptcy regulations and international agreements. One specific framework, as an alternative source of space activities financing, is the so-called Cape Town Regime, which will apply to the financing of high-volume expenses related to moveable assets and thus subject to conflicting rules of law. The Cape Town Convention⁴ along with its Space Assets Protocol⁵ offer a better legal regime for asset-based financing of space activities and make a major contribution to regulatory innovation in the development of the space sector.

The potential adverse effects on the environment resulting from outer space activities are self-evident. The most significant of these remains space debris. The potential environmental hazards, especially from radioactive material or toxic fuels, are obvious, yet there are no UN treaties that address these, and this area is regulated by voluntary soft-law guidelines. As the Space Debris Mitigation Guidelines have a moral and political value it is expected that states will comply. Ferreira-Snyman's chapter on the environmental responsibility for space debris has been updated with more suggested solutions for the lack of legal definitions for space and space debris, and more arguments in favour of the Space Debris Mitigation Guidelines having become customary international law. She also unpacks the legally complex issue of Active Debris Removal (ADR), and its relationship with the UN Charter's Article 51 right of self-defence. The applicability of international environmental law to space activities, and how this interacts with the common heritage of mankind principles, has also been updated. However, UN space law remains of little assistance in the environmental management of space activities and has in practice not been extended to apply to outer space. The lack of a definition of a 'space object' and the practical difficulties in establishing fault and causality, are discussed on the section dealing with liability for environmental damage in terms of the Liability Convention. She calls for a new treaty that will be binding on all UN member States to regulate all aspects on the use of outer space, but recognises that as an interim measure, further soft law guidelines on both the mitigation of and remediation of space debris should be developed. The consulting editor also expands on the space policy spectrum in Africa and highlights the creation of the Africa Space Agency by the African Union.

Hanlon discusses the unusual topic of planetary protection, in other words what protection, if any, exists or should be implemented regarding the exploration and use of the Moon and other celestial bodies? Planetary protection focuses on protecting our own Earth from contaminants (backward contamination) while also protecting the unknown from Earth contaminants (forward contamination). Article IX Outer Space Treaty obligates States to avoid 'harmful contamination' but unfortunately does not define it. Article IX of the Moon Agreement also does not define what it means to 'disrupt' the existing balance, or what an 'adverse' change is. The Committee on Space Research (COSPAR) was created in 1958 and is regarded as the authoritative body guiding compliance with Article IX Outer Space Treaty. Its Guidelines are not binding, and states apply them on a politically voluntary basis, which Hanlon considers soft law. In

1999, COSPAR chartered its Panel on Planetary Protection (COSPAR PPP) which maintains and updates the Policy on Planetary Protection, built around five categories of space mission/target planet combinations. The World Heritage Convention provides definitions of cultural and natural heritage, of which there are many on the Moon. Hanlon urges responsibility when contemplating space resource utilisation techniques and the establishment of human communities in space. States should adopt the COSPAR Policy as part of their licensing process under their Article VI Outer Space Treaty obligations.

Cheney unpacks the rare topic of space settlement. The 1967 Outer Space Treaty is a treaty of principles that lays the foundation for the space governance regime. Space mining, space settlement and eventually space states, are all compatible with the Outer Space Treaty and international law, albeit the regime will have to evolve and the details of how exactly to govern these will need to be determined. He does not flinch from addressing the broader, more moral, ethical and philosophical questions. Here a paradigm shift is required by recognising that for many, exploration and colonisation is a non-fiction, due to 400 years of European imperialism, and that the word 'colonisation' is to be avoided. The Outer Space Treaty, and the body of space law that emanated from it, applies to the activities of states and their (human) nationals in outer space. Thus, states are not claiming jurisdiction over outer space but rather over the people conducting activities there, bearing in mind the weight of the moral obligation that space is to be used for the benefit of all. Exploration, in the sense of scientific investigation and settlement, in the sense of stations and installations and outposts, are permitted. Article II of the Outer Space Treaty was premised on preventing a European-like scramble for overseas colonies, but never to prohibit human expansion beyond Earth, thus rendering it an appropriation and therefore not a banned activity. Terraforming is allowed, as long as there is no Article IX Outer Space Treaty harmful contamination. Cheney suggests that any jurisdictional issues are to be addressed by analogy to the ISS IGA and its Code of Conduct.

In the context of establishing and governing settlements in outer space, Ferreira and Ferreira-Snyman investigate the extra-territorial application of human rights instruments in outer space settlements. This relates to the intersection between space and international human rights law. Christol in 1968 already remarked that human rights agreements have generally been identified as being earth-orientated, but there is no fundamental reason for not recognising their applicability to the space environment. Although the Outer Space Treaty contains no specific provision on international human rights in outer space, it appears to suggest that it is applicable on humans living and travelling in outer space.

The authors conclude that the legal issues are as important as the technical and scientific expertise, and international human rights treaties drafted on and for Earth may find extra-territorial application as the establishment of state sovereignty over a celestial body is not required because effective control over the settlement would be sufficient.

In this context the proper regulation of legal relationships, in spite of the unpredictability of human nature and self-interest of states, is paramount, and no legal regulation whatsoever will make the situation worse. The unique circumstances in which the settlers would find themselves necessitate the introduction of some new human rights and the serious limitation of others, for example the right to procreation may need to be seriously limited, and the right to oxygen, food and water may have to be guaranteed. Any legal arrangements concerning the establishment of settlements in outer space can only be preliminary and will require adaptation and amendment. The immediate attention of the international community of states and private companies active in outer space is required. UNCOPUOUS, in spite of its slow decision-making process based on consensus, appears to be the only body to undertake the mammoth task of a complete review of the current, and enactment of a future outer space legal regime.

The massive growth in space activities will inevitably lead to more disputes, with two main legal issues, according to Gould: Which law applies and what is the forum? Normally it is the law governing liability and compensation, but one answer is to provide choice of law and forum in a clear dispute resolution clause in the contract. Not a single State has yet utilised Article II Outer Space Treaty read with Article 33 UN Charter to refer a space activity matter to the International Court of Justice (ICJ), and the USA had in any event withdrawn its recognition of the ICJ jurisdiction in 1985. The claims procedure in the Liability Convention has also never been called on. Gould considers the local law in context and the applicable international law (including relevant treaties, conventions, and protocols), as well as dispute resolution processes, the international use and application of dispute escalation clauses, plus the applicable laws and arbitration rules of various fora. Included is a useful discussion on the Permanent Court of Arbitration's optional rules for Arbitration of Disputes relating to outer Space Activities, and on the United Nations Commission on International Trade Law (UNCITRAL) 2010 Outer Space Rules.

Bielicki analyses evidence from space in cases before international courts and tribunals. Incredibly, there has not been a single case before an international court strictly relating to space law. On some occasions courts have referred to certain aspects of space technologies, mostly space applications, while considering their cases. This chapter gives a handy insight into the treatment of space technologies by the ICJ, for instance in border/frontier disputes; delimitation of fishing rights and continental shelves; whaling; ecosystem monitoring; environmental disputes and conflict resolution; International Tribunal for the Law of the Sea (ITLOS; delimitation of maritime boundaries; the International Criminal Tribunal for the Former Yugoslavia (ICTY); the International Criminal Court (ICC; and international criminal law. The ICJ has no specific rules of evidence, but ITLOS makes orders for the conduct of cases, and the ICTY and ICC have their own rules of procedure and evidence. Before the ICJ unfortunately, satellite images were treated with great caution and as corroboration of existing facts only.

This updated textbook will prove a handy reference work on outer space law for the practitioner, space policy adviser, academic and government lawyer.

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- 1 Endorsed by UNCOPUOS 62nd Session Doc (12–26 June 2019) A/AC.74.20, at para 163 and Annex II.
 - 2 Principles for Cooperation in the Civil Exploration and Use of the Moon, Mars, Comets, and Asteroids for Peaceful Purposes <<https://www.nasa.gov/specials/artemis-accords/img/Artemis-Accords-signed-13Oct2020.pdf>>
 - 3 Although drafted to look like a treaty, the Artemis Accords do not adhere to the definition of a treaty as set out in sub-Art 2(1)(a) of the Vienna Convention on the Law of Treaties.
 - 4 Cape Town Convention on International Interests in Mobile Equipment 2001, 2307 UNTS 285.
 - 5 Protocol to the Convention on International Interests in Mobile Equipment on Matters Specific to Space Assets (signed in Berlin on 9 March 2012, not yet in force) <<https://doi.org/10.5235/CTC.2012.124>>