

Introductory remarks

ADVANCING STATE RESPONSIBLE BEHAVIOUR IN OUTER SPACE FROM AN INTERDISCIPLINARY PERSPECTIVE

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ABSTRACT: A question particularly worthy of attention is that set by the challenge of reconciling the free use of outer space with the sustainable use of its resources. The time seems ripe to bring international law into the space sustainability discourse. The concept of sustainable development was conceptualized by the 1987 Brundtland Report, Our Common Future. Today, as then, the overlap between the security, environmental and economic dimensions, including in terms of intra/inter-generational equity, is reflected within the current 'new space' era that is now 'our common future'.

Over the last decade the space sector has expanded with massive growth in investment activity by State and not state-actors. It is estimated that the future value of the space economy could surge to over \$1 trillion by 2040.¹ A plethora of actors, especially industry, gain access to space and spacecraft technologies. The 'new space' has been recognized as one of the most efficient engines of development at global level.² There is a general common understanding that we are entering a new phase of the space age. Launch costs have reduced significantly and the number of space actors continues to increase. Recent studies estimate that about 17,000 asteroids might be exploited for resource extraction, with benefits for space industry around \$2.7tn per year by 2050.³

¹C. Cinelli, "The evolving regulatory framework for space resource utilization", in *La Comunità Internazionale*, 3/2023 pp. 483-510; S. Di Pippo, *The Space Economy. La nuova frontiera dello sviluppo*, Bocconi University press, 2022, 71 ff.; S. Marchisio, *Law of Outer Space Activities*, Edizioni Nuova cultura, 2022, 19 ff.

²R.S. Jakhu, P.S. Dempsey, *Routledge Handbook of Space Law*, Routledge, 2016, 339 ff.; European Space Agency, *The Socio-Economic Impact of Space Activities*, 2019, available at <https://space-economy.esa.int>; OECD, *Evolving Public-Private Relations in the Space Sector*, Paris, 2021; Id., *Handbook on Measuring the Space Economy*, 2nd ed., OECD Publishing, 2022.

³See the report drafted by The Hague Centre for Strategic Studies, *The New Space Era*, 2021, available at <https://hcsc.nl/space>.

The impact of space activities on society is growing stronger under a dual perspective: firstly, the ‘space for Earth’ perspective; and, secondly, the ‘space for space’ perspective. Regarding ‘space for Earth’, it typically refers to achieving sustainability from space, thus looking at the impact of space activities on Earth, i.e. Earth observations, satellite navigation and connectivity. This is most appreciated as a major driver of the 2030 Agenda on Sustainable Development.⁴ Regarding ‘space for space’, it especially refers to achieving sustainability in space, which is mainly appreciated as a technical guidance on the safe use of space.⁵ Most recently the report of the UN Secretary-General was open to further normative developments on space security.⁶ At the same time, in 2021, a Working Group on Legal Aspects of Space Resource Activities was established within the UN Committee on the Peaceful Uses of Outer Space (COPOUS) as a forum of discussion on sustainability for space resource utilization.

However, there has not been any relevant update of the space body of (hard) law yet, which results incomplete today. Regulatory frameworks fall short of regulating the increasing space activities. The legal regime of outer space is based on the principle of freedom of space resource utilization. The main limits of the freedom of States are imposed by a ‘minimum core obligations’, namely the obligation of non-appropriation, that of peaceful utilization and that of due regard. At the same time, the ‘old space’ body of law recognizes the common interest of humankind in outer space. However, it does not define its legal contours. Furthermore, only few States have assumed ‘additional obligations’ according to the Moon Agreement, without, however, yet fulfilling them. A rapidly growing global awareness in a fairer and commonly accepted rules and standards for space resource utilization has recently led to extend the concept of sustainability to the outer space regulatory framework.

In such a changing technological and geopolitical paradigm, a question particularly worthy of attention is that set by the challenge of reconciling the free use of outer space with the sustainable use of its resources. It is therefore valuable to not forget that the five UN treaties on outer space were adopted during the old space era.⁷ In particular, the 1967 Outer

⁴ *UN Space2030 Agenda*, 2021.

⁵ *UN Debris Mitigation Guidelines*, 2007; *UN Guidelines on long-term sustainability of outer space activities*, 2019.

⁶ *Reducing space threats through norms, rules and principles of responsible behaviours*, 2021.

⁷ Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, adopted 27 January

Space Treaty codified the traditional principle of freedom as governing principle of outer space.⁸ It provides an incomplete response for a prompt and effective relief against unsecure, unsafe, and unsustainable space-related operations by States or other entities. The timing of a response to the challenge of new space is undoubtedly important. The great need for more precise legal and operation measures to advance responsible State behaviour in this respect is evident.

It is against this backdrop that this edited book focuses on how States should regulate activities in space and explores strategies to advance State responsible behaviour to ensure sustainable use and effective protection of outer space for peaceful purposes. The time seems ripe to bring international law into the space sustainability discourse. The concept of sustainable development was conceptualized by the 1987 Brundtland Report, *Our Common Future*. Today, as then, the overlap between the security, environmental and economic dimensions, including in terms of intra/inter-generational equity, is reflected within the current ‘new space’ era that is now ‘our common future’.

This edited book is published in the framework of an interdisciplinary research projects carried out by the editor, Professor Claudia Cinelli, at the Political Sciences Department, University of Pisa. She fostered exploratory and emerging research on outer space, combining legal and political approaches with innovative space technologies, jointly with the Massachusetts Institute of Technology (Media Lab, Space Enabled Group) under the Global Seed Fund grants.

This edited book collects original theoretical and empirical contributions. It contributes to unpack the international outer space regulatory framework in the light of current trends and pressing challenges. In particular, it focuses on a rapidly growing global interest in a sustainable use of outer space and highlights the necessity of ensuring a greater coordination and cooperation between and among established and emerging actors in space. This is an innovative research book aiming at understanding the le-

1967, entered into force 10 October 1967 (*UN Treaty Series*, No. 610, at 205); Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, adopted 22 April 1968, entered into force 3 December 1968 (*ivi*, No. 672, at 119); Convention on International Liability for Damage Caused by Space Objects, adopted 29 March 1972, entered into force 1 September 1972 (*ivi*, No. 961, at 188); Convention on Registration of Objects Launched into Outer Space, adopted 12 November 1974, entered into force 15 September 1976 (*ivi*, No. 1023, at 15); Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, adopted 5 December 1979, entered into force 11 July 1984 (*ivi*, No. 1363, at 3).

⁸Treaty on Principles Governing the Activities of States (OST), *cit.*, Article I.

gal contours between ‘State responsible behaviour’ and the concept of ‘space sustainability’. While they are conceived of as interconnected, corresponding initiatives to this issue are still quite fragmented. Fragmentation has fostered a lack of clarity and ambiguity, and above all, has made it hard to grasp the complexity of space sustainability through the law.

It is divided into seven Chapters. The first Chapter, *Does use of satellite data justify unsustainable use of outer space?* by Katarzyna Pogorzelska (European Commission Joint Research Centre) looks at space data. It highlights that even if space data supports sustainable development, not every type of satellites and data are equally valuable in this respect and concludes that responsible use of outer space is the best guarantee of the continuous space support for terrestrial sustainability. In any case, outer space environment needs to be considered in the interdisciplinary context of the planetary boundaries framework. Accordingly, the second Chapter, *Sustainability and corporate social responsibility in outer space* by Elena Cirkovic (Media Lab-MIT, Helsinki University) argues that legal scholars and practitioners need to constantly learn and develop in communication with other disciplines and types of knowledge, as well as environmental changes and developments such as for instance, the exponential increase of space debris. International space law is currently ill-equipped to ensure accountability of corporations for the possible impacts of their outer space activities. The third Chapter, *Business, human rights and international space law: filling the gaps of corporate accountability in the ‘New Space’* by Chiara Macchi (Wageningen University) offers an original analysis looking at the human rights and environmental due diligence legislations currently emerging in Europe to assess whether they could apply to the outer space activities of corporations and contribute to bridge some of these governance gaps. At the same time, the environmental perspective of the common heritage of humankind principle might contribute to responsible behaviour in the conduct of States activities in outer space as argued by the fourth Chapter, *The principle of ‘Common Heritage of (Hu)mankind’: its implementation in the light of the Law of the Sea and the Law of Outer Space* by Anne Sophie Martin (National Research Council of Italy). On the other hand, the fifth Chapter, *Rights without remedies? The role of arbitration in enforcing international space law for private parties* by Laura Yvonne Zielinski (Holland & Knight) underlines that while private actors are thus indirectly governed by international space law, the enforcement mechanisms are limited to States and analyses whether arbitration can fill this remedy gap. Furthermore, *National Space Laws and Regulations stemming from International Space Law* by Emanuela Maio (University of Parma) seeks to explore the role of private law in regulating space-related activities at domestic level,

taking Italy as case study. The last Chapter, the seventh, *NPS in Outer Space for peaceful uses: an evolving legal framework* by Viviana Iavicoli (National Council of Research of Italy) addresses the use of nuclear technologies for space missions, highlighting that they are mostly regulated by international instruments of voluntarily nature, which can be incorporated by national laws. Finally, *Concluding remarks. Recognizing and addressing the challenge of interdisciplinary collaboration, design, and governance in sociotechnical systems* by Katlyn M. Turner (MIT-Space Enabled Group) underlines that governing outer space, like all great societal challenges of today, is an inherently multidisciplinary endeavour. Though legal scholars and lawyers write and make the laws and treaties that underpin the use and regulation of outer space, these laws could not be developed, implemented, and accepted without the input, collaboration, and collective expertise of stakeholders across different fields of expertise and lived experiences.

The edited book's target consists of academics and students, as well as public and private-sector practitioners interested in legal and policy challenges connected to outer space law and politics. These include, specifically: Researchers and students from Europe, Asia, Australia, South and North America and beyond looking at outer space issues through the lenses of legal studies (particularly international law and European law), political sciences, space business and management; Legal practitioners working in the space public or private sector (lawyers, consultants, CSR officers, legal officers, etc.) and willing to familiarize themselves with the expanding areas of liability risk connected to the economic, social and environmental impacts of outer space activities; Policy-makers at the national, EU and international level bearing responsibility for the elaboration of space policy and legislative solutions to the trends and challenges identified in the book; Civil society advocates focusing on outer space, including in connection with space economy dynamics.

