

**FRANS VON DER DUNK AND FABIO TRONCHETTI,
HANDBOOK OF SPACE LAW, CHELTENHAM, EDWARD
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With the emergence of novel space technologies and new space actors, space law is currently challenged more than ever. However, while space activities enter new phases of development, the relevant legal regime remains unchanged. In fact, space law, the body of law that governs space activities¹, was created during the 1960s, when the main space activities were comprised of the launch of artificial satellites and their use for communication purposes². Nevertheless, since then, novel space realities, such as the possibilities for human spaceflight, the emergence of microsatellites, plans for extraterrestrial space settlements, and the prospects for extra-terrestrial resources exploitation are posing new challenges to the traditional concepts that are reflected in the existing space law regime³. The *Handbook of Space Law*, edited by Frans von der Dunk and Fabio Tronchetti⁴, offers a valuable overview of the current state of space law and places it within the new challenges it is called upon to address.

The book uses a fact-based approach to address these challenges and to answer what is the role of space law in mitigating them. By dividing the chapters into thematic segments based on the various types of currently existing space activities, the editors of the book provide a clear-cut understanding of the caliber of space activities and their governance by the existing space law provisions. The methodology of the book is carefully selected to address the issues in a pragmatic manner by connecting the factual circumstances of space activities to the legal challenges and issues at hand.

The book begins with an overview of the historical background of space law

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¹ *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, 27 January 1967, 610 UNTS 205 (entered into force 10 October 1967) [*Outer Space Treaty*]; *Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched Into Outer Space*, 22 April 1968, 672 UNTS 119 (entered into force 3 December 1968) [*Rescue Agreement*]; *Convention on International Liability for Damage Caused by Space Objects*, 29 March 1972, 961 UNTS 187 (entered into force 1 September 1972) [*Liability Convention*]; *Convention on Registration of Objects Launched into Outer Space*, 6 June 1975, 1023 UNTS 15 (entered into force 15 September 1976) [*Registration Convention*]; *Agreement governing the Activities of States on the Moon and Other Celestial Bodies*, 5 December 1979, 1363 UNTS 3 (entered into force 11 July 1984) [*Moon Agreement*].

² Bin Cheng, *Studies in International Space Law* (Oxford: Clarendon Press, 1997) at 14-16 [Cheng]; Francis Lyall & Paul B Larsen, *Space Law — A Treatise* (Farnham, UK: Ashgate, 2009) at 3-5.

³ Ram S Jakhu & Joseph N Pelton, *Global Space Governance: An International Study* (Switzerland: Springer, 2017) at 3-13.

⁴ Frans von der Dunk & Fabio Tronchetti, *Handbook of Space Law* (Cheltenham: Edward Elgar, 2015) [Frans von der Dunk & Fabio Tronchetti, *Handbook of Space Law*].

by Peter Jankowitsch (chapter one)⁵. This chapter explains the history of space law's *genesis* and its political context. The author of this chapter sets the scenery for the rest of the book and enables the reader to understand the origins of today's space law regime and, as such, its objectives and principles.

The second chapter of the book, authored by Frans von der Dunk⁶, introduces the reader to the actual provisions comprised in the *corpus juris spatialis* by exhaustively presenting the five United Nations space treaties⁷ combined to more recent legal instruments mainly of a soft law nature. The author of this chapter manages to demonstrate the evolution of space law from a consent-based approach to one of voluntary participation and flexibility⁸. The next chapter, chapter three, outlays the relationship between international and national space law. The author of this chapter, Irmgard Marboe, offers an extensive overview of national space laws by focusing on selective issues such as national authorization of space activities, registration of space objects, and responsibility and liability⁹.

The fourth and fifth chapters of the book address two topics complementary to each other: the creation of European space law and the emergence of international organizations. These two chapters, both authored by Frans von der Dunk, constitute a broad overview of the organizational structure of the "management" of space activities. The fourth chapter mainly focuses on the European Space Agency and its successful cooperation with European space projects such as Galileo and Copernicus¹⁰. The fifth chapter furthers the discussion on the organizational structure of space activities at the international level. Through this overview, the chapter makes the reader realize that the biggest part of successful space international organizations has been either initiated or later built up by private initiatives¹¹. In addition, this chapter sheds light on the role of private actors in forming international space law through institutional agreements and multilateral cooperation schemes¹².

The sixth chapter of the book, authored by Fabio Tronchetti, provides an overview of the regulation of the military uses of outer space. It starts with the basic principles that govern the military uses of outer space, *i.e.* the relevant provisions of the

⁵ Peter Jankowitsch, "The Background and History of Space Law" in Frans von der Dunk & Fabio Tronchetti, *Handbook of Space Law*, *supra* note 4 at p 1.

⁶ Frans von der Dunk, "International Space Law" in Frans von der Dunk & Fabio Tronchetti, *Handbook of Space Law*, *supra* note 4 at p 29 [Frans von der Dunk, "International Space Law"].

⁷ *Outer Space Treaty*, *supra* note 1; *Rescue Agreement*, *supra* note 1; *Liability Convention*, *supra* note 1; *Liability Convention*, *supra* note 1 and *Moon Agreement*, *supra* note 1.

⁸ Frans von der Dunk, "International Space Law", *supra* note 6 at 106.

⁹ Irmgard Marboe, "National Space Law" in Frans von der Dunk & Fabio Tronchetti, *Handbook of Space Law*, *supra* note 4 at p 127.

¹⁰ Frans von der Dunk, "European Space Law" in Frans von der Dunk & Fabio Tronchetti, *Handbook of Space Law*, *supra* note 4 at p 205.

¹¹ Ram S Jakhu et al, "Regulatory Framework and organization for Space Debris Removal and On Orbit Servicing of Satellites" (2017) 4 J of Space Safety Engineering 129 at p 131-136.

¹² Frans von der Dunk, "International Organizations in Space Law" in Frans von der Dunk & Fabio Tronchetti, *Handbook of Space Law*, *supra* note 4 at p 269.

Outer Space Treaty, its predecessors and successors¹³, and continues with legal instruments that were later adopted on a politico strategic basis. The chapter concludes with the observation that the ever-increasing military uses of outer space – even if not aggressive – raise concerns about space security and render the need for adapted new space laws essential.

In chapters seven to twelve the book turns towards space activities mainly involving private space actors. Peter van Fenema emphasises the need for an international body to manage licensing and registration issues (chapter seven)¹⁴. Building on the same perspective, Frans von der Dunk observes the shift from public to private activities in the field of satellite communications and remote sensing, which seems to pose barriers to international cooperation. He argues that such cooperation might prove to be unachievable through the outdated mechanisms of the International Telecommunication Union (ITU), requiring thus new mechanisms tailored to the needs of the private space industry (chapters eight and nine)¹⁵. Lesley Jane Smith reaches similar conclusions by discussing the complexity of Global Navigation Satellites Systems (GNSS) and emphasizes the need for a novel international liability regime to provide the necessary legal certainty required by new space actors (chapter ten)¹⁶. The part on private space activities concludes with one of the most upcoming space activities, the public and private manned space flights (chapters eleven and twelve)¹⁷, where Carla Sharpe and Fabio Tronchetti, and Frans von der Dunk, present the state of relevant technologies and the legal challenges that they present. They suggest that the model of the International Space Station be followed for the regulation of public manned spaceflights.

With chapter thirteen, the book turns to environmental issues, such as space debris, space hazards and planetary protection¹⁸. Lotta Viikari argues for a long term sustainability plan to address issues that the past did not foresee and those that are yet to arrive, while Fabio Tronchetti, addresses the issue of extraterrestrial resources utilization by laying out the conflictual situations that may arise and by suggesting as possible solution the adoption of international binding rules (chapter fourteen)¹⁹.

¹³ Fabio Tronchetti, "Legal Aspects of Military Uses of Outer Space" in Frans von der Dunk & Fabio Tronchetti, *Handbook of Space Law*, *supra* note 4 at p 331.

¹⁴ Peter van Fenema, "Legal Aspects of Launch Services and Space Transportation" in Frans von der Dunk & Fabio Tronchetti, *Handbook of Space Law*, *supra* note 4 at p 382.

¹⁵ Frans von der Dunk, "Legal Aspects of Satellite Communications" in Frans von der Dunk & Fabio Tronchetti, *Handbook of Space Law*, *supra* note 4 at p 456; Fabio Tronchetti, "Legal Aspects of Satellite Remote Sensing" in Frans von der Dunk & Fabio Tronchetti, *Handbook of Space Law*, *supra* note 4 at p 501.

¹⁶ Lesley Jane Smith, "Legal Aspects of Satellite Navigation" in Frans von der Dunk & Fabio Tronchetti, *Handbook of Space Law*, *supra* note 4 at p 554.

¹⁷ Carla Sharpe and Fabio Tronchetti, "Legal Aspects of Public Manned Spaceflight and Space Station Operations" in Frans von der Dunk & Fabio Tronchetti, *Handbook of Space Law*, *supra* note 4 at p 618; Frans von der Dunk, "Legal Aspects of Private Manned Spaceflight" in Frans von der Dunk & Fabio Tronchetti, *Handbook of Space Law*, *supra* note 4 at p 662.

¹⁸ Lotta Viikari, "Environmental Aspects of Space Activities" in Frans von der Dunk & Fabio Tronchetti, *Handbook of Space Law*, *supra* note 4 at p 717.

¹⁹ Fabio Tronchetti, "Legal Aspects of Space Resource Utilization" in Frans von der Dunk & Fabio Tronchetti, *Handbook of Space Law*, *supra* note 4 at p 769.

In chapter fifteen, Frans von der Dunk explores all the possible space sectors where trade regulations might apply and he also presents the specific regime applicable to satellite communications trade issues²⁰. In that manner, he raises questions of how similar or divergent are space commercial activities to traditional commercial activities and how far the commodification of space resources – in a broad term – could go as technology further advances. By the same token, Mark Sundhal addresses the issue of the unification of law as far as transnational transactions of equipment necessary for space activities are concerned (chapter sixteen)²¹. The author of this chapter delves into questions of legal certainty and the lack of incentives for private capital invested in space activities. He suggests that the *Protocol to the Convention on International Interests in Mobile Equipment on Matters Specific to Space Assets (Space Assets Protocol)*²² be modified to address the current needs of the private space industry and thus incentivize their investments through higher protection standards.

In chapter seventeen, Cécile Gaubert moves on to insurance for damage caused by space debris and personal astronaut insurance to demonstrate that space activities do not only require insurance when undertaken in outer space.²³ On the contrary, their complex and ultra-hazardous environment starts from their planning on Earth and requires more and more perplex and sophisticated legal mechanisms as space activities become multidimensional²⁴.

The book concludes with two chapters on Intellectual Property (IP) rights and dispute resolution mechanisms (chapters eighteen and nineteen)²⁵. Both chapters, authored by Catherine Doldirina and Maureen Williams respectively, are centered on the need to provide legal certainty to private space actors by enhancing IP protection and access to *ad hoc* adjudication mechanisms. Catherine Doldirina provides an excellent overview of the IP regime that is currently applicable to space activities and identifies the lacunae that emerge from the absence of sovereignty and precise State jurisdiction in outer space²⁶. Therefore, she argues for a specialized IP regime adjusted to facilitate space activities (chapter eighteen)²⁷. Maureen Williams follows a similar conceptual analysis to argue for a specialized dispute settlement regime, based on

²⁰ Frans von der Dunk, "International Trade Aspects of Space Services" in Frans von der Dunk & Fabio Tronchetti, *Handbook of Space Law*, *supra* note 4 at p 814.

²¹ Mark Sundahl, "Financing Space Ventures" in Frans von der Dunk & Fabio Tronchetti, *Handbook of Space Law*, *supra* note 4 at p 874.

²² *Protocol to the Convention on International Interests in Mobile Equipment on Matters Specific to Space Assets*, 9 March 2012, UNIDROIT (not in force).

²³ Cécile Gaubert, "Insurance in the Context of Space Activities" in Frans von der Dunk & Fabio Tronchetti, *Handbook of Space Law*, *supra* note 4 at p 910.

²⁴ Cheng, *supra* note 2 at 367.

²⁵ Catherine Doldirina, "Intellectual Property Rights in the Context of Space Activities" in Frans von der Dunk & Fabio Tronchetti, *Handbook of Space Law*, *supra* note 4 at p 949 [Doldirina]; Maureen Williams, "Dispute Resolution Regarding Space Activities" in Frans von der Dunk & Fabio Tronchetti, *Handbook of Space Law*, *supra* note 4 at p 995 [Williams].

²⁶ Percy Blount, "Jurisdiction in Outer Space: Challenges of Private Individuals in Space" (2007) 33 *J of Space Law* 299 at 305.

²⁷ Doldirina, *supra* note 25.

arbitration (chapter nineteen)²⁸. The author of this chapter suggests that the space law regime should be adjusted to render *ad hoc* adjudication procedures attractive to space actors by providing specific rules for responsibility for debris, environmental deterioration, climate change, and celestial bodies' exploration.

By addressing these traditional and modern space law issues, the book constitutes a manual that could be used by academics, space law students, researchers and practitioners in the field. Starting from long known and well established issues of space law that are mainly State-centered, it moves on to cover the most complex modern issues involving private participation. Therefore, the book successfully demonstrates the evolution of space activities and the subsequent turn from public to private regulation. The same is also effectively achieved through the logical sequence of the chapters as they build on each other, thus creating a comprehensive and complete web of the past, current, and –possibly– future space law. In addition, the sources and bibliographical references used in the book derive from a wide-ranging space law scholarship and cover the existing space law literature thus providing a useful tool for space law students and researchers.

However, the book could have further benefited from a theoretical justification of the issues it addresses. Despite the fact that it discusses in detail the main current issues in the field of space law, it does not go beyond a pragmatic approach. Such an approach renders the book relevant and temporal to current issues. However, a more theoretical and futuristic approach could have broadened the utility of the book with regards to future space uses and activities as well as the subsequent legal issues that might arise. Consequently, the book would have contributed further to the academic dialogue and discourse, had it also taken into account the theoretical aspects of the topics it touches upon.

As a final point, Frans von der Dunk and Fabio Tronchetti successfully complete their task to produce a handbook, as it is both introductory enough for those who wish to have a first acquaintance with space law, and also adequately specialized for those who want to delve deeper into complex space law issues.

²⁸ Williams, *supra* note 25; UNCOPUOS, *Permanent Court of Arbitration Optional Rules for Arbitration of Disputes Relating to Outer Space Activities*, 51st Sess, UN Doc A/AC.105/C.2/2012/CRP.17 (2012).