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This recent book is part of the European Space Policy Institute (ESPI) “Studies in Space Policy” series. With publications dating back to 2009, this ESPI series is characterized by the innovative insights and prospective analysis regarding issues relevant to the European space sector.

As the year 2019 will mark 50 years of the Moon Treaty and the 50th anniversary of the Apollo 11 mission, the average person is instinctively aware of the greatness of Humanity’s feats in space since the 1950s. Six decades after *Sputnik*’s launch in 1957, *space* can be said to have a considerable impact on the daily lives of citizens living in a truly global economy. So much so, that certain sectors of the economy can be said to be dependent upon space to thrive.

In simple terms, progress as related to the space sector is now intertwined with the specific dynamics of “industry 4.0”, a concept portraying a dynamic characterized by private sector investment playing a leading role in the world economy. Momentously, private investment is planned for the long-term, aiming to achieve return on investment targets foreseen for a time-frame spanning over a decade or longer.

If one considers the way in which Humanity has accessed outer space, the basic principles remain valid since gunpowder was invented in China during the 10th century: the use of rockets powered by solid fuel remains the favoured launching technology. Nonetheless, looking specifically at the space sector and at space activities in “industry 4.0” terms, the last years of the second decade of the 2000s are often described by academia as the “private astronautics” years. This description is reinforced by predictions that by 2030 the private sector’s contribution to the world space activity will be far more momentous than two decades ago.

In this context, the book makes a solid contribution toward further confirming a little disputed trend: the increased involvement of private companies in space activities explains in large part why an increasing number of States has been enacting national space legislation during the current decade.

Remarkably, space law has gone through interesting development periods. Having emerged in the wake of the launch of the first satellite in 1957, it was born as a product of the status of international relations at that time. The 1960s are marked by the work of the UN’s Committee on the Peaceful Uses of Outer Space (COPUOS), set up by the General Assembly in 1959. This work would culminate in the international legal instruments that form the core of the *Corpus Iuris Spatialis*. By comparison, the 1980s signal the beginning of a period when UN General Assembly resolutions enshrined crucial principles for space law. More recently, the States’ efforts have shifted towards developing recommendations and guidelines. Simply put, from a time characterized by the enactment of binding international legal instruments we have entered a

time when the emphasis is placed on the development of non-legally binding instruments.

In this context it is no surprise that, in broad terms, the book makes evident a very interesting trend: the number of States that have chosen to enact national space legislation has increased steadily during the past decade. One needs only recall that, in the 1970s, Norway and the USA were the only States whose domestic law comprised national space legislation. Even more interesting is the fact that until the end of the year 2000 there were only other four States that had enacted national space legislation – namely, Sweden (1982), the UK (1986), South Africa (1993) and Australia (1998). Yet, starting in 2005 the number of States enacting national space legislation registered a significant increase (e. g., Belgium in 2005, France in 2008) and the number rose again in the last three years: the USA (2015 and 2018), New Zealand (2017), Luxemburg (2017), the UK (2018) and Portugal (2019).

In fact, the year 2018 was eventful as States like the UK, already possessing national space legislation, chose to enact new legislation (the UK's *Space Industry Act of 2018*). Crucially, the next two years are set to be very interesting as different States are working toward: (1) the enactment of national space legislation (e. g., Germany); (2) the review of existing legislation (e. g., Norway, the first State to enact a national space legislation). Certainly worth noting is the fact that in early 2019 Portugal enacted its national space legislation: *Decree-Law no. 16/2019 of 22 January 2019*.

All throughout the book the authors spread out references to 2017 and 2018 COPUOS Legal Subcommittee activities, further allowing the reader to better seek to understand the legal dynamics at play in Europe and elsewhere. Whereas in 2017 States in COPUOS signalled interrogations and hesitations regarding certain private sector-led space activities, in 2018 the States moved the debate forward, focusing on ways to better implement the international obligations stemming from the Outer Space Treaty (OST), thereby refocusing the debate on the future perspectives for Space Law, mindful of the foreseen increase in private sector involvement.

Thus, the enactment of national space legislation by States at different latitudes increasingly emerges as a most important trend. On the one hand, national space legislation fulfils at national level the obligations that are derived for States from the international legal instruments of the 1960s, affording them the necessary interpretation. On the other hand, national space legislation will – as this book rightly signals – mirror the changes underway pertaining to space as a key sector of the worldwide economy.

The space sector in Europe is traversing a highly dynamic period. A main example of the present-day legal dynamism, and the need States feel to have

increased legal certainty and flexibility, is provided by the UK. Enacted in the first quarter of 2018, the Space Industry Act (Royal Assent dating from 15 March 2018, consequently not covered by the book) provides a high-level framework geared towards enabling commercial spaceflight activities, providing a comprehensive albeit unified regime for sub-orbital and space activities. Henceforth, ensuring complementarity, the UK regime will have the Outer Space Act (1986) regulating activities carried out by UK entities overseas, while the Space Industry Act (2018) will regulate activities carried out from the UK.

Therefore, the authors' option for a chronological systematization is most advantageous as it allows the reader to grasp the way in which the rationales, scopes and subject matter pertaining to national space legislation changed in the last 35 years – as did the space sector as a whole. In Chapter 1, the book frames the work it sets out to achieve: undertaking an impactful comparative analysis of national space legislation of eight EU Member-States (Sweden, UK, Belgium, the Netherlands, France, Austria, Denmark and Luxemburg) and four other States (Australia, the People's Republic of China, Indonesia and New Zealand). This innovative selection is balanced as it allows a comparison between legal regimes dating back to 1982 (Sweden) – a time when private actor involvement was limited – and more recent legal frameworks, namely Luxemburg's *Law on the exploration and use of Space resources* from 2017. The option was made to keep to a minimum all references to the legal regimes of the two leading spacefaring States – the United States of America and the Russian Federation –, whose legal frameworks were deliberately not selected for analysis in an effort to keep the study in focus.

Chapter 2 begins with a rigorous consideration of important criteria national legislators are wise to take notice of when enacting national space legislation. The authors mainly point to the importance of the *Sofia Guidelines for a Model Law on National Space Legislation* and the recommendations part of UNGA Resolution 68/74 of 11 December 2013, in order to address the very important question of the desired scope for national space legislation. Simply put, should national space legislation be the sum of all national legislation with an impact on space activities? Or, conversely, should national space legislation chiefly define what rights and what obligations exist in the framework of national space activities in the territory of a given State?

In order to better offer the reader different analytical elements and also to provide the setting for the detailed analysis in Chapters 3 and 4, the authors perform a seamless flyover in Chapter 2 covering the main space law international legal instruments and key topics and concepts linked with the rationale for the enactment of national space legislation (such as international liability, and *launching state* as pertaining to registration). Here, the authors recall the

importance of the OST, underlining the obligations stemming for States from Article VI, Article VII and Article VIII. For analytical clarity, the authors focus on the wording of Article VI OST, in order to make the valid point that the drive to enact national space legislation, thus, stems from the Public International Law regime: national space legislation thereby represents the continuity, embodiment and completion of the *Corpus Iuris Spatialis*. Additionally, the authors also resort to the wording of Article VIII OST to underline the fact that a permanent oversight obligation seems to derive for the space object's registration State.

Upon reading through Chapters 1-3 the reader will be aware that national space legislation should broadly fulfil three goals. First, national space legislation is aimed at creating a domestic law framework enabling an orderly development of space activities – fulfilling an indirect obligation of the Outer Space Treaty. Secondly, national space legislation defines the administrative competences required to regulate space activities, introducing a degree of legal certainty while appealing to private actors. Finally, national space legislation may also play a role in consolidating the Public International Law legal framework (e. g., with reference to the vertical limits of State sovereignty and/or the obligation of registering space objects).

The option of dedicating a separate Chapter 4 exclusively to Luxemburg's national space legislation is laudable. The context and background pertaining to Luxemburg's Law on the exploration and use of Space resources is peculiar as it envisaged an exceedingly specific space activity: space resource mining. For this reason, Luxemburg's national space legislation is assessed under a different light, making use of additional analytical criteria specifically relating to the exploitation of space resources. As Chapter 4 makes abundantly clear, space resource mining is set to become both a highly lucrative space activity as well as a (legal) challenge for States in the medium to long-term.

By Chapter 4 the reader is perfectly aware of an interesting and somewhat noticeable point: despite similarities at distinct levels, national space legislation stems from a country-specific context that informs certain options adopted by the lawmakers. Linking Chapter 2 with Chapter 5, the authors enable the reader to understand that there is an interesting margin for complementarity between national space legislation and Space Law. This emerges with reference to both the choice of defining the scope of the specific national space legislation (e. g., by adopting a “functionalist” approach at domestic level) and the option of defining at what moment in time should the obligation to register space objects be fulfilled. Moreover, there are differences as to the understanding of the concept of “space activity” for domestic law purposes.

Moreover, as Chapter 5 demonstrates with remarkable clarity, the scope of the national space legislation as well as the subject matter thereof (as pertaining

to a specific set of concepts and topics: authorisation; insurance; recourse and liability; registration; environmental protection; and enforcement) changes somewhat depending on the national priorities or objectives that the specific State set out to accomplish by enacting a national space legislation. To this end, the choice of creating a table-based comparison in Chapter 5 with reference to the national space legislation provisions looked at in Chapter 3 is especially fitting. Primarily, in my view, this option contributes to making the book appealing to researchers and students of other fields of science showing a renewed interest in the space sector, namely Engineering.

Significantly, Chapter 6 presents a condensed set of final considerations. Whereas a previous seminal work (2011) on the same topic set out to accomplish a deeper analysis of national space legislation with reference to specific space law topics, the current book is very effective in fulfilling the objective of offering an innovative country-by-country focused analysis of national space legislation. This will enable the reader to aptly grasp key differences emerging over three decades and across continents.

Hence, this book is a very useful reference both for the Public International Law researcher interested in space law as well as the space law practitioner. Firstly, the work combines an unswerving analysis of selected national space legislation together with a solid methodology. Secondly, the book performs a nimble flyover spanning selected States in Europe and the Asia-Pacific region in a 35 years' time-frame. And in so doing, the book allows the reader to navigate across different national space legislation, empowering an understanding of the core similarities and differences between national space legislation of European and Asia-Pacific region States – some States being either space-faring nations or emerging players in the space sector. It is, thus, a valuable guide not only for legal practitioners, but also for practitioners of other fields (namely, Engineering) who require a balanced comparative law analysis of national space legislation.

The space sector in Europe currently displays a very strong dynamism. This being said, the technical progress associated with the space sector is already placing pressing challenges before national space legislation. For example, the foreseen shift toward a platform recovery model with an “in-orbit” servicing/repair component will require complementarity with other fields of law at national level.

A positive development is that the growing investment by the private sector in space activities is being met with an increasingly acute awareness on behalf of States vis-à-vis the role space plays in the economy and, crucially, is set to play in the years ahead up to 2030. This book helps promote the valuable idea that law holds the potential to be an efficient enabler of increased private sector

involvement in space activities – provided national space legislation promotes legal certainty while simultaneously fostering unhindered innovation.

In closing, at a time when more European States focus efforts on enacting national space legislation, this work certainly is a solid reference for those readers interested in better understanding the added value and the role of national space legislation for the future of space exploitation.