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# DEVELOPMENT OF NATIONAL SPACE LEGISLATIONS OF CEE COUNTRIES AND THEIR IMPLICATIONS ON SPACE SECTORS

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**Summary**

The dissertation entitled “Development of National Space Legislations of CEE Countries and their implications on space sectors” examines the evolution of space law, tracing its connection to economic policy and its role in a rapidly changing global space ecosystem, with particular focus devoted to national space legislations. The first chapter establishes a theoretical framework by exploring the two main functions of law in the economy: its steering function, which directs and stimulates economic growth, and its stabilizing function, which provides the legal certainty needed for investment. This framework is then applied to the space industry, analyzing how national policies and the transition from *Old Space* (government-oriented space exploration) to *New Space* (commercial and private sector involvement) shape the current space ecosystem. The second chapter delves into the analysis of the formation of international space law, reviewing the five foundational treaties that form the *Corpus Iuris Spatialis*. It evaluates the continued relevance of these Cold War-era agreements in the modern, commercialized space environment. The analysis also extends to the European context, examining the new EU Space Strategy for Security and Defence and the potential for new EU-level regulations despite the legal complexities of the Lisbon Treaty. The third chapter shifts to a comparative analysis of national space laws, using the UK, France, and Luxembourg as key examples. It identifies common legislative elements such as definitions, licensing, liability, and environmental protection while highlighting how each country tailors its regulations to foster specific domestic space industry sectors. The fourth chapter then focuses on the Central and Eastern European (CEE) region development, tracing the involvement in the space programmes of the selected countries and their integration into the European Space Agency (ESA). This section highlights the new national space laws emerging in countries like Slovakia, Slovenia, and Poland as a direct result of these changes. To ensure a balanced analysis, Greece's space legislation is examined as a long-standing point of comparison. The final chapter synthesizes these findings to a practical framework for national space legislation. It identifies specific legal clauses that are crucial for promoting a robust space ecosystem and offers examples of solutions for governments aiming to develop and support their domestic space sectors.

## Introduction

The *Corpus Iuris Spatialis*[1], based on five international space treaties, constitutes an unprecedented basis for space law. Nevertheless, the growing presence of diverse space stakeholders, and the increasing congestion of outer space which has limited absorption capacity for certain orbits, requires consideration of the relevant legal environment for space activities, *inter alia*, at national level. Over the past few years, efforts to introduce national legal systems governing space activities has become increasingly noticeable. Similarly, activities to amend existing regulations have been intensified in order to keep pace with technological developments and current space sector demand. The reasons for this state of affairs lie in various aspects, which are discussed in detail in this dissertation. Furthermore, regional legislation is gaining in importance - for example, the recently proposed European Union Space Law (EUSL).

While international treaties provide a foundational legal framework, and there is no doubt about the need to comply with the provisions contained therein, the development of space law in the context of domestic space regulations requires careful consideration. Are there a clear boundaries between international space law and national law? Which areas are dedicated and imposed by International Space Treaties, and which ones remain within the remit of the regulator? Distinguishing between these boundaries is not a simple matter, given that national law must be consistent with international law, which obliges the States to fulfil international obligations. National space activities, however, have their own specifications which cannot be overlooked by the legislator if the sector is to be competitive, thus representing a high level of development. Regulations can have a positive impact on this market segment, but they can also have a negative consequences, slowing down its functioning due to unclear or comprehensiveness of regulations. This dissertation focuses on identifying legal factors that

[1] i.e. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, adopted by the General Assembly in its resolution 2222 (XXI), opened for signature on 27 January 1967, entered into force on 10 October 1967 ("Outer Space Treaty"); The Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space adopted by the General Assembly in its resolution 2345 (XXII), opened for signature on 22 April 1968, entered into force on 3 December 1968 (The "Rescue Agreement"); Convention on International Liability for Damage Caused by Space Objects, adopted by the General Assembly in its resolution 2777 (XXVI), opened for signature on 29 March 1972, entered into force on 1 September 1972 ("Liability Convention"); Convention on Registration of Objects Launched into Outer Space, adopted by the General Assembly in its resolution 3235 (XXIX), opened for signature on 14 January 1975, entered into force on 15 September 1976 ("The Registration Convention"); The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, adopted by the General Assembly in its resolution 34/68, opened for signature on 18 December 1979, entered into force on 11 July 1984.("The Moon Agreement").

may influence the functioning of national space sectors, which the author of this dissertation examines below.

Due the increasingly visible tendency towards the implementation of National Space Legislations (NSLs), the author primarily focused on a region that shows certain gap in this area, which, however, has recently been systematically filled by implementing regulations or publishing draft legislation. Therefore this dissertation entitled "The development of national space legislations in the Central and Eastern European Region and its implications on space sector" aims at indicating the legislative challenges and perspectives that the CEE countries, wishing to regulate space activities at national level need to address. In order to achieve this, the analysis is based on existing European space legislations and laws that are currently being implemented or drafted with a focus on CEE Region. For the purposes of this dissertation, the countries of Central and Eastern Europe are classified on the basis of the so-called "Three Seas Initiative*",* which is a forum of 13 countries in Central and Eastern Europe whose territory is located between the Adriatic, Black and Baltic Seas. These countries include Slovenia, Slovakia, Romania, Poland, Lithuania, Latvia, Hungary, Greece, Estonia, Czech Republic, Croatia, Bulgaria and Austria.[2] Most of the countries in the region present deficiencies in space sector regulation and their examination in this dissertation serve as a reference for countries willing to regulate space activities, particularly for emerging space actors. Nevertheless, it would be a challenge to analyse in detail all the countries in the region, so in order to conduct a comprehensive study of aspects related to NSL, the author of the dissertation focuses on a few of them, namely Slovenia, Slovakia and Poland (which is currently working on its own Space Activities Act) and Greece therefore, placing them in the context of the broader CEE region concerned.

It should be borne in mind that the lack of regulation at national level implies, on the one hand the non-compliance with the obligations of international space treaties but from the other perspective it provides an opportunity to regulate the sector in such a way that national space legislations can serve as a lever for the development of indigenous space sector. Nevertheless it should be taken into consideration that, there is also a risk that inadequately tailored regulation to the needs of the market may hinder its development hereby discouraging any activity in the sector. Therefore, the subject matter of this dissertation is focus around the consequences of the lack of such legislation, but primarily, on the implications of introducing national space regulations, if any are present. This is achieved through the examination of

[2] Three Seas Initiative. *Three Seas Summit in Warsaw 2025.* Available at :https://3seas.eu/ (Accessed:30.08.2025).

existing space regulations at international, regional and national level, considering the European countries with the visible development of the domestic space sector in the last decade i.e. Luxembourg, France and United Kingdom as well as those from CEE Region, which have a development potential in relation to their own space industries.

Another objective of this dissertation is to identify the needs of the selected space markets in the *New Space* environment from a legislative perspective, in order to properly target regulatory measures at national level. To achieve this, the space sectors of the relevant CEE countries were analysed in an interdisciplinary manner i.e. from legal, policy (thorough the space strategies) and economics perspective (taking into account, among other things, the size of the sector, elements of space economy, etc.). Nevertheless, these aspects are presented in a general manner, with the aim of outlining the relevant factors, which are shaping the domestic space market and, possibly, influencing the development of selected regulations.

The fundamental research hypothesis posits that a robust national space legislative regime can stimulate and provide a conducive environment for the advancement of space endeavours. Therefore, the lack of regulation of space activities at national level, as well as the frequent changes in regulation that are a consequence of the dynamics that characterise space activities, can create significant risks in various forms. Existing regulations are often subject to change due to market or technological trends, and some services are not regulated at all national level or no agreement has been reached at the international level on their regulation. This implies an insecurity regarding legal framework, among space stakeholders, particularly those conducting commercial space activities.[3] It is worth noting that a narrowly focused regulatory framework could disturb technological progress, while an overly broad scope might limit innovation of space activities. For this reason, it is important to look at the premises for introducing National Space Legislation but also at the barriers that affects its implementation. To fulfill the objective, the author presents the following research problems:

[3] Baumann, I., El Bajjati, H. and Pellander, E. (2018) *NewSpace: A Wave of Private Investment in Commercial Space Activities and Potential Issues Under International Investment Law*, Journal of World Investment & Trade, 19(5), pp. 930–950.p.950.

**Research Problem No. 1**

What is the impact of existing space law on the space sector?

The priority for legislators should be to fulfill the international obligations imposed on countries through space treaties. While international treaties do not explicitly require states to enact domestic space laws, doing so is the most effective way for fulfilling their obligations.[4] Currently, there are about 40 national space legislations worldwide in which international obligations are implemented. However, in addition to the basic clauses reflecting the provisions of international space law, through national space legislation, legislators can influence the market by either inhibiting or developing it. The question therefore arises as to how regulate the space sector not to under- or overregulate it. Whether the implementation of the space law at national level has had any impact on the development of the domestic space sector?

Ensuring clear and transparent legal mechanisms should therefore be the aim of introducing legislation at national level. In addition, the priority should be to regulate the market in such a way as to enable space stakeholders to develop in the long term, on the basis of both legal and financial instruments, in a sustainable manner and taking due account of the risks that a given space venture may assume. Appropriately targeted regulation can contribute to a certain security and stability in the sector and, consequently, to an increased interest in space activities in a given legal environment, both from the perspective of entrepreneurs, international organisations and potential investors. The risk of inadequate regulation, on the other hand, has far-reaching consequences, manifesting itself, *inter alia,* in the suppression of market competitiveness on international stage. In order to examine the research problem indicated above, the author of the dissertation analyses the national space legislations of Luxembourg, the United Kingdom and France, recognising that the sectors in question have seen the development and growth in recent years in the context of the space activities. [Regarding this specific research problem the author attempts to present a study verifying the number of space objects launched after the entry into force of space law in countries such as the UK, Luxembourg and France.

**Research Problem No. 2**

How does space law shape the landscape of the space sector?

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[4] J.Tapio, A.Soucek: *The European Space Agency's contribution to national space law*. in: Karjalainen, K., Tornberg, I., Pursiainen, A. (eds) International actors and the formation of laws. Springer Online, 2022. p 117.

The implementation of space regulation at the national level often involves minimising risks to mitigate international liability and mitigating the risk of limiting innovation and industry in the domestic space economy.[5] Regulatory uncertainty often creates risks to the potential revenues of projects and consequently reduces their profitability, innovation investment as well as private sector interest.[6] The implementation of space regulation at the national level involves minimising risks to mitigate international liability ( through authorization, supervision or the insurance obligation)

As Ram Jakhu rightly points out[7] "However, it must be kept in mind that 'one size cannot fit all'; i.e. laws and policies are and ought to be unique to the specific political, constitutional, legal, economic, technological, social and other circumstances of each nation."[8] Therefore, the aim of this dissertation is to look at regulations determined by specific indigenous space sectors or, conversely, to analyse the development of sectors that have influenced the shaping of space legislation. The main analysis is based on countries that have introduced space regulation at national level and whose space sector has experienced a rapid development in recent years i.e. Luxembourg, France and United Kingdom.

Nevertheless the question also arise whether the space legislation introduced at national level is keeping pace with technological developments? Numerous revisions of national space legislation are noticeable. Countries that, despite an advanced sector, have been operating without space legislation for a long time are also taking steps towards regulating their national space activities. According to Baumann et al. (2018) "Laws and regulations concerning commercial space activities are established in many countries, but they are currently reviewed and amended in the light of technology and market trends. Certain new services and applications are not yet addressed under national laws at all, or there is no consensus on their treatment at international level. Overall, there are significant uncertainties and/or evolutions regarding the legal framework in which space companies are operating".[9] Therefore this dissertation undertakes an analysis of the evolving legal frameworks relating to space activities within selected jurisdictions (such as the United Kingdom and France which have recently

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[5]. Sherbone, A.K.E. (2022) 'The Commercialisation of Space: An Overview of Legal Risks and Considerations', in Pozza, M.A. and Dennerley, J.A. (eds.) *Risk Management in Outer Space Activities: An Australian and New Zealand Perspective*. Singapore: Springer, pp. 19-46,p.33.

[6] European Investment Bank Group, *Investment barriers in the European Union 2023*. Available at: https://www.eib.org/attachments/lucalli/20230330_investment_barriers_in_the_eu_2023_en.pdf (Accessed:30.082025).

[7] Jakhu, R., 2009. *Capacity building in space law and space policy.* Advances in Space Research, 44(9), pp.1051-1054, p.1052.

[8] Ibidem.

[9] Baumann et al. (2018).

updated their legislations), with the objective of examining their responsiveness to the dynamic advancements occurring within the space sector.

**Research Problem No. 3**

What might be the impact of a potential space law on the space ecosystems of the CEE countries?

There are specific *rationales* behind the introduction of space legislation, which seem to be common to most countries. Nevertheless, what factors are influencing the countries of Central and Eastern Europe, which are increasingly bold in taking steps to actively participate in the space ecosystem both regionally and globally and express their willingness to regulate space activities.

The process of establishing cooperation with the European Space Agency has enabled many space emerging countries to obtain contracts and participate in large projects that they would not have been able to participate on their own. The impetus provided by programmes such as PILS in the case of Poland led to the development of national capabilities and expertise, which was reflected in the building of a space industry that in many cases was truly nascent. Countries began to introduce space strategies, create financial support programmes for R&D and, at a later stage, business incubators, with the aim of commercialising activities in the space sector. During the Cold War, the countries of Central and Eastern Europe were under the dictates of the Soviet Union, so their knowledge and expertise was related to programmes operating within that bloc. As a result, the countries of the region developed appropriate specialisations, financing mechanisms and political or economic support.[10] Nevertheless, this situation has resulted in certain limitations characteristic of this region, such as a lack of awareness among local authorities about the potential of space and the continued lack of priority given to the space sector, a low level of cooperation between institutions and industry, and a relatively low public and private investment rate in the space sector.[11] The lack of space legislation at the national level (which has recently improved slightly) was also a visible gap in the CEE Region countries. Nevertheless, the Central and Eastern European Region is characterised by high potential in terms of innovation and well-embedded international cooperation which gives it a good chance of increasing its importance in the space sector at the European scale.

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[10] European Space Policy Institute, 2014 *ESA Enlargement* Available at: https://www.files.ethz.ch/isn/176962/ESPI_Report_47.pdf (Accessed:30.08.2025).

[11] Bukała A. Malinowska K. Szwajewski M. *Barriers of entering space market. Case of entrepreneurs in Central Eastern Europe*, IAC-22- 5-GTS.1, 73rd International Astronautical Congress (IAC), Paris, France, 18-22 September 2022.

Due to the dynamic development of space technologies and the resulting risks as well as challenges, the countries of the Central and Eastern European region may become pioneers in certain segments, such as environmental protection. The regulatory framework governing the space environment and its protection is undergoing rapid changes, necessitating a specialized approach to address critical concerns such as space debris. Due to this legal gap,establishing a novel regulatory regime from its inception may be a unique opportunity for nascent space sectors like those for CEE Region. Setting up a new regulatory framework may allow for the facilitation of these emerging sectors while ensuring their operations align with principles of sustainable development.

## Methodology

The research method used in this dissertation include dogmatic, historical, analytics and comparative law methodology based on an analysis of existing space law and policy instruments at international, regional and national level. The dissertation is complemented by an empirical method.

The historical method serves to examine the formation of international space law towards the *rationale* for the regulation of space activities at the time of the establishment of the *Corpus Iuris Spatialis* and thus to identify the common indicators that led to the formation of the legal foundations of space activities. This method is also partly used in the analysis of space strategies by identifying the circumstances for shaping space policies in a historical context.

A comparative method was used to analyse existing national space legislation in thesectors that have seen significant growth in space activities and the surrounding space ecosystem at a regional level, i.e. legislation from the UK, France and Luxembourg, as well as newly emerged space legislations from the Central and Eastern European region, i.e. Slovenia and Slovakia and also the draft law on space activities on the example of Poland as well as Greece.

The analytical method was used to investigate the space activities of the Central and Eastern European countries, i.e. countries belonging to the Three Seas Initiative in the context of development directions and assumptions of the space strategies of the countries concerned

and the policies adopted, with particular emphasis on the countries of the region indicated above.

The empirical method was based on collecting the opinions of the Polish space stakeholders. The study was performed by the author of the dissertation as a co-author and subsequently published within the framework of the Working Group for Polish Space Law established at the Centre for Space Studies of Kozminski University (CSK ALK) in the Ad Astra. Astropolitics and Space Law Research Program.[12]

## Structure of the dissertation

The first chapter aims to provide an overview of the interaction between business law and economy. The main purpose of this chapter is to outline the general functions of law in the economy, with particular emphasis on the functions of business law. An important function is developed, namely the steering function, which, in the legislative sphere, is important for stimulating economic development but is also adjusted to current and necessary needs of the country as well as citizens. In addition to this function, which is of significant importance, the stabilising function is developed in detail. Guarantee of legal stability influences investment growth and other economic indicators.[13]

Focusing on space strategies, this section pays particular attention to how state policy consistently influences the sector's development. In addition to space strategies, the second part of the chapter is connected to characterisation of the space industry and its function in economy from global, regional and national perspective. An important part is the comparative characterisation of the so-called *Old Space* with the *New Space* approach. Special attention is paid to the characteristics of space segments, their impact on the state and society as well as the benefits and revenues generated from the space sector but also the challenges and dangers it creates. One of the tasks of the stabilisation function is to consolidate *the status quo* in terms of economic, social relations as well as state and legal development strategies.[14] Therefore, it is important in the context of the space sector to identify space strategies and analyse them on a

[12] K. Hopej , M. T. Kłoda , K.Malinowska , B. Malinowski , M. Polkowska *Survey for professionals and entrepreneurs of the Polish space sector on the scope of regulations and solutions of the Polish Space Law Act.* Ad Astra. Astropolitics and Space Law Research Program. Available at: https://adastra.im.edu.pl/ (Accessed: 30.08.2025).
[13] Bidziński, M. (2016) *Pojęcie, istota i zasady prawa gospodarczego*(, in Bidziński, M. and Jagiełło, D. (eds) Prawo Gospodarcze, Zagadnienia Wybrane. Warszawa: Wydawnictwo C.H. Beck p.7;8.
[14] Ibidem,p.8.

national but also supranational background, as in the case of the European Space Programme[15] or European Union Space Strategy for Security and Defence[16]. As has been previously highlighted the business law is still guided by the economic policy of the state. For this reason, on the example of selected space strategies, their impact on the formation of law, more precisely space law, are analysed.

The second chapter presents the environment of space law from *Corpus Iuris Spatialis* to soft law mechanisms at international level. In addition to the five international space treaties, a proposal to implement space law at the EU level is examined as well as its potential influence on National Space Legislations in general. This chapter describes the concept of international space law, formation of international space law as well as historical background. Five space treaties are indicated, namely Outer Space Treaty, Liability Convention, Registration Convention, Rescue Agreement and the Moon Agreement. In this dissertation, the treaties are not analysed in depth, due to the numerous publications that have already been elaborated in this area. Rather, this analysis seeks to identify elements that met the needs of the Old Space era at the time in order to compare them with the current needs of space stakeholders. The classification of international space law plays an important role in this part. The conclusion of this sub-section is to answer the question to what extent the regulations adopted at the international level are reflected in the current environment of space activities.

Another aspect addressed in this chapter is the newly introduced European Union Space Strategy for Security and Defence, which implies the implementation of EU Space Law. Nevertheless, in accordance with Article 189 of the Lisbon Treaty[17] any harmonisation of the space laws and regulations of the Member States is excluded. The purpose of this analysis is to examine potential EU interference in space law and to verify the possible advantages and disadvantages of this actions as well as potential areas that the European Union Space Law may cover. The last part of this chapter is devoted to the current trend regarding the approach to regulating space activities towards soft law mechanisms. International action taken on space activities and e.g. environmental protection is often based on non-binding mechanisms such as guidelines or standards of the international organization i.e. UN resolutions etc. The purpose of

[15] Regulation (EU) 2021/696 of the European Parliament and of the Council of 28 April 2021 establishing the Union Space Programme and the European Union Agency for the Space Programme and repealing Regulations (EU) No 912/2010, (EU) No 1285/2013 and (EU) No 377/2014 and Decision No 541/2014/EU.

[16] Council of the European Union 2023, preceded by the Joint Communication on an EU Space Strategy for Security and Defence presented by the Commission and High Representative to the European Parliament and the Council on 10 March 2023, 7315/23.

[17] Consolidated version of the Treaty on the Functioning of the European Union Part Three- Union Policies and internal action title XIX-Research and Technological Development and Space . Article 189.

this sub-section is to verify the effectiveness of such mechanisms compared to the established hard law that has so far formed the basis for space activities.

The third chapter devoted to National Space Legislations is presented from comparative perspective. Its purpose is to identify common elements but also differences in the regulation of the various national space sectors in order to identify support clauses for specific national space markets. The chapter concerns a general overview of National Space Legislations from regional, European perspective. Space law exemplary models such as e.g. UN Resolution Recommendations on national legislation relevant to the peaceful exploration and use of outer space (UN Resolution)[18] and Sofia Guidelines for a Model Law on National Space Legislation(Sofia Model Law)[19] are described in detail. On the basis of selected space legislation i.e. UK, French and Luxembourg, relevant building blocks are identified. Within these elements, the following are indicated: Definitions, Authorization and Supervision, Registration Liability (together with Insurance), Environmental protection and additional components. The purpose of this part is to review how national legislators regulate space activities with a particular focus on supporting the development of the domestic space stakeholders. Despite the introduction of the same building blocks the regulations differ from each other and countries are focusing on specific space segments to create an innovative ecosystem around them, depending on their area of expertise and their particular needs.

The fourth chapter analyse the evolution of the space sector in the countries of the CEE Region and the impact of these developments on the growing demand for national space legislation. Particular attention is paid to the perspective of the space programmes of the existence of the Iron Curtain period, showing their characteristics and conditions. This is followed by a discussion of the fundamental paradigm shift in space activities that has occurred in the CEE region through the European Space Agency (ESA) Enlargement process. One implication of this transformation is, for example, development at the level of introduction of national regulations for the space sector in the region as in the case of Slovakia, Slovenia and the draft Polish Law on Space Activities . The legislative potential in the context of space activities in the countries of the Central and Eastern European Region is also analysed.

The concluding chapter, which is chapter five, includes aspects covered in the previous parts of the thesis. It focuses on the identification of clauses that have an impact on the space

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[18] United Nations General Assembly (2013*). Recommendations on national legislation relevant to the peaceful exploration and use of outer space*. A/RES/68/74. 11 December 2013.

[19]Committee on the Peaceful Uses of Outer Space, Legal Subcommittee (2013) *Information on the activities of international intergovernmental and non-governmental organizations relating to space law: Draft model law on national space legislation and explanatory notes*. 52nd session. Vienna, 8-19 April 2013.

economy and, more specifically, its development in general or targeted at a specific segment of space activity in view of indigenous sectors. The final section examines the implications of the introduction of national space legislation on relevant space sectors opportunities related to the implementation of national space legislation and proposed postulates.

## Chapter 1

The economy of the state, in a broad perspective, is one of the elements determining and forming the development of modern states.[20] A tool that can undoubtedly influence business activities- is the law. Nevertheless, demonstrating this impact is a difficult issue, in particular the level off this influence.[21] and requires careful consideration. W. Hoff points out that "In the case of legal sciences, the method of regulation is the set of legal instruments of state influence on the market and the enterprises operating in it. This plane is inextricably linked to the analysis of the legal conditions for the application of regulatory instruments".[22] On the one hand, the regulator's priority should be to regulate the market in such a way as to enable development in the long term on the basis of *inter alia* both legal and financial instruments. On the other hand, there is a risk that inept legislation could lead to monopolisation of certain sectors of the economy or result in capital flight.[23] In order to correctly identify the impact of regulatory instruments on the space economy, it is first necessary to identify the features of business law, to which a section of this chapter is devoted.

This chapter also identifies the respective space strategies which are increasingly being implemented at national and regional level worldwide. The *rationale* for their inclusion in this thesis, is closely related to the examination of the emergence of space law. According to the Cologne Commentary on Space Law: "History shows that the political effect of achievements in cosmonautics often proved to be so significant for state leaders that it determined the directions of development of space programs themselves. Strictly speaking, it was space policy to give an impetus to space activities." Furthermore in relation to the Commentary *"*And then what came first: space policy, space activities, or space law? It would seem that the answer to this question is clear: first, there was a space policy, space activities followed, and only then space law emerged. However, it is not that simple."*[24]* The author verifies the validity of this statement in this chapter.

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[20] Bidziński (2016, p.3).
[21] Kufel, J. and Siuda, W. (1998) *Prawo Gospodarcze dla Ekonomistów*, Poznań: Scriptus, p. 23.
[22] Hoff, W. (2008) *Prawny model regulacji sektorowej* Warszawa: Difin.p.22.
[23] Bidziński (2016, p.8).
[24] Hobe, S., Schmidt-Tedd, J. and Schrogl, K. (eds) (2010) *Outer Space Treaty,* in Hobe, S., Schmidt-Tedd, J. and Schrogl, K. (eds) Cologne Commentary on Space Law. Carl Heymanns Verlag, Köln, 2010. p.23.

## Chapter 2

During the Space Race and the height of the Cold War, space capabilities were absorbed by two states as an expression of demonstration technological predominance and aspirations for space exploration. *Corpus Iuris Spatialis* created decades ago, were in line with the realities in space exploration, created and directed by United States and the Union of Soviet Socialist Republics. On the backdrop of international space law, that is the Outer Space Treaty, the Rescue Agreement, the Liability Convention, the Registration Convention and the Moon Agreement, the relations between states have been shaped while excluding private entities as addressees of the norms of space law, whose presence in space was rather impossible. As Pershing stressed out: “Private individuals and corporations were not mentioned in the Treaty, likely not because they were purposefully excluded, but rather because the drafters at the time had no reason to imagine a need to extend the application of the Treaty to such parties. The Treaty was drafted under the assumption that States would be the only actors in space. Indeed, given the technological capabilities at the time, launching a human being into space required the full support of an entire nation—it would have been very near impossible for a private company to marshal the necessary resources to accomplish something similar on its own.”[25] In the 21st century, the space discourse has changed and increasing number of states across the globe are expanding their space capabilities."[26]

Therefore the current space sector has witnessed a significant expansion, with an increasing number of emerging states integrating space infrastructure into their strategic plans. In the era of New Space the commercial space industry is having an increasing impact on the functioning of the global space ecosystem. New business services with commercialisation potential have emerged. This change is certainly influenced by growing commercialisation and cost reduction associated with, deployment of megaconstellations, launching services, the development of new technologies (such as in-space manufacturing or on orbit servicing as well as introduction of new applications from micro- and nano satellites constellations as well as)[27] and many more. This state of affairs has a definite impact on the current international discussion on space law.

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[25] Pershing,A.D. Interpreting the Outer Space Treaty’s NonAppropriation Principle: Customary International Law from 1967 to Today: 7: Available at: https://openyls.law.yale.edu/bitstream/handle/20.500.13051/6733/Pershing.pdf?sequence=2 (Accessed: 30.08.2025).
[26] Ibidem.
[27] OECD (2023, p.7).

The development of space law at international level started with the adoption of the Declaration of Legal Principles[28] and five aforementioned space treaties between 1967 and 1979. The following stage involved declarations and legal principles from the 80s and 90s such as Broadcasting Principles from 1982[29], Remote Sensing Principles from 1986 [30], Nuclear Power Sources Principles from 1992[31], as well as 1996 Benefits Declaration.[32] The newest period concerns, mostly provisions of a guideline nature as well as technical aspects related to space activities, based on UN COPUOS Resolutions and various Guidelines, which takes rather the form of so-called "soft law" instruments.[33]

From the international perspective, instruments describes above form a diverse regulatory framework of binding and non-binding nature, have been implemented due to the growing possibilities for outer space utilization and the consequences that this entails. Nevertheless, despite its nascent stage, the field of space law was already emerging in the 1930s. Due to the subject of the dissertation focused around Central and Eastern European Region, particular attention is focused on two key pioneers in space law from this region: Czech lawyer Vladimír Mandl (1899-1941) and Polish lawyer Manfred Lachs (1914-1993), whose significant contribution were crucial in development of the doctrine[34] and in shaping the later foundations of international space law in the global perspective.

This chapter describes the concept of international space law, its formation and development as well as historical background on the basis of the five space treaties. Particular

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[28] Declaration of Legal Principles Governing the Activities of States in the Exploration and Uses of Outer Space General Assembly resolution 1962 (XVIII) of 13 December 1963.

[29] The 1982 Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting.

[30] The Principles Relating to Remote Sensing of the Earth from Outer Space General Assembly resolution 41/65 of 3 December 1986.

[31] The Principles Relevant to the Use of Nuclear Power Sources in Outer Space General Assembly resolution 47/68 of 14 December 1992.

[32] The Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries General Assembly resolution 51/122 of 13 December 1996.
The Rule of Law in Outer Space: The Effects of Treaties and Nonbinding Agreements on International Space Law Brian Wessel:7.

[33] These resolutions include: International Cooperation in the Peaceful Uses of Outer Space (A/RES/5/122 2000); Application of the concept of the "launching State" (A/RES/9/115); Recommendations on enhancing the practice of States and international intergovernmental organizations in registering space objects (A/RES/62/101); Recommendations on national legislation relevant to the peaceful exploration and use of outer space (A/RES/688/74); Safety Framework for Nuclear Power Source Applications in Outer Space(A/AC.105/934); Space Debris Mitigations Guidelines of the Committee on the Peaceful Uses of Outer Space (ST/SPACE/49); Declaration on the fiftieth anniversary of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (A/RES/72/78) .

[34] Kopal, V. and Hofmann, M. (2013) 'Vladimír Mandl (20.3.1899 – 8.1.1941)', in Hobe, S. (ed.) Pioneers of Space Law: A Publication of the International Institute of Space Law. Leiden; Boston: Martinus Nijhoff Publishers, pp. 56–69.

focus is especially oriented towards the last element which is connected to *rationale* of the treaties formation. In relation to space law formation the reasons for the involvement of the UN COPUOS in the work of international space law, rather than the International Legal Committee (ILC), are of great importance, as the Author explains in this dissertation. However, the treaties will not be interpreted, neither analysed in depth, due to the numerous studies that have already been elaborated in this area. Rather, this analysis seeks to identify elements that met the needs of the so-called *Old Space Era* at the time, in order to compare them with the current necessities of space stakeholders. This is particularly relevant in the context of the space stakeholders, who currently represent a diverse range of actors compared to the formative period of international space law.

The objective of this chapter is to verify to what extent the internationally adopted regulations in the *Old Space Era* are reflected in the current environment of space activities i.e. in the *New Space Era*. On the basis of international space treaties, the author selects a number of legal issues that are emerging in the space sector of XXI century and which require appropriate action from the legislative perspective . The author additionally identifies gaps, the filling of which is important for the shaping of the national space law system nowadays.

## Chapter 3

As already highlighted space law is part of the public international law system, where a significant element concerning general international law also applies to principles of space exploration.[35] With the increasing commercialization of outer space, appropriate legal mechanisms not only on international level (in the form of soft-law mechanisms) but also on national level - are necessary, for various reasons which are examined in this section. International space law has inadequate instruments to preserve the space ecosystem in the realm of XXI century. The realities of the New Space era are forcing the legal community to take relevant actions in this regard on a national level. Therefore some states are expanding their domestic space laws, and countries that are developing their space activities are introducing more and more space legislation at national level to address this challenges.

Already in 2013, in order to universalise, at least to some scope, the national framework for space legislation, the UN Resolution (A/RES/68/74) stated:

[35] Article III of the Outer Space Treaty.

> "Recognizing the different approaches taken by States in dealing with various aspects of national space activities, namely by means of unified acts or a combination of national legal instruments, and noting that States have adapted their national legal frameworks according to their specific needs and practical considerations and that national legal requirements depend to a high degree on the range of space activities conducted and the level of involvement of nongovernmental entities".[36]

Thus, in the absence of a unified scheme for regulating national space activities, countries on their own have started to introduce legal instruments, depending *inter alia* on the needs of the internal space market. Nowadays, the situation is even more dynamic, due to the opening up of participation opportunities in space projects for many countries. There is a noticeable trend to amend already introduced space acts in order to meet the demands of the current space market environment which is rapidly changing and evolving. On the other hand, countries entering the space market are increasingly expressing a willingness to implement national space law, for example in their national space strategies which was already presented in chapter 1 of this dissertation.

The diversification of space industry stakeholders and the increasing commercialization of space activities are growing proportionally to the importance of domestic space law in the overall governance of space activities. It is in States interest to ensure that non-governmental space stakeholders are organized in responsible manner. To ensure that sufficient resources are available throughout the life cycle of space activities, the adequate financial and technical safeguards are also necessary.[37] One of the solutions is developing and implementing the national space legislations, which seems to be the common approach of many European countries (but not only European) who thus wish to provide the above measures for the proper governance of space activities.

While international treaties do not explicitly require states to enact domestic space laws, doing so is essential for effectively fulfilling their obligations. These laws play a crucial role in supervising and authorizing non-governmental space activities, registering space objects, and addressing liability issues.[38] Many European countries have comprehensive national space

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[36] United Nations General Assembly. (2013). Recommendations on national legislation relevant to the peaceful exploration and use of outer space. A/RES/68/74. Available at: https://documents-dds-ny.un.org/doc/UNDOC/GEN/N13/454/22/PDF/N1345422.pdf?OpenElement (Accessed: 30.08.2025).

[37] Tapio, J. and Soucek, A. (2022) 'The European Space Agency's Contribution to National Space Law', in Karjalainen, K., Tornberg, I. and Pursiainen, A. (eds) International Actors and the Formation of Laws. Cham: Springer, pp. 125–127.p.117 Available at: https://link.springer.com/chapter/10.1007/978-3-030-98351-2_6#Fn19 (Accessed: 30.08.2025).

[38] Ibidem.

legislation (i.e. Italy, Netherlands, Denmark, United Kingdom of Great Britain and Northern Ireland, Belgium, Austria, Luxembourg, France, Portugal, Slovenia and Greece). However, some countries, such as , Germany[39], and Spain[40], lack such legislation despite their significant contribution to the European space sector. While other ESA member states, including Poland[41], Hungary, Ireland, Estonia, Switzerland, Romania, and Czech Republic , have not yet established comprehensive legislative frameworks to address this specific issue, several of these states are currently engaged in the process of drafting national space legislation.[42]

The development of national space laws can both promote and hinder the growth of domestic space sectors. On the one hand, they provide legal stability and certainty, attracting investment and fostering innovation. On the other hand, the process of for example obtaining a license can be time-consuming and complex, potentially slowing down the pace of development. Additionally, the rapid technological advancement can make it challenging for legislators to keep up with emerging trends and applications. To address these challenges, countries can draw on existing models like the UN General Assembly Resolution and the Sofia Model Law or with a more specific purpose such as Building Blocks for the Development of an International Framework for the Governance of Space Resource Activities.[43] These models offer guidance on key aspects of national space legislation, such as authorization, liability, international cooperation, and the registration of space objects.

This chapter first presents a general overview of implemented regulations on space activities within European countries. The author then analyses the elements that propose different models for the regulation of space activities at national level. The legislations of the United Kingdom, France and Luxembourg are examined in depth as countries with a highly developed space sector and in order to identify appropriate Building Blocks and development support clauses. Draft laws as well as newly introduced national space legislations in CEE

[39] German law relating to space activities concerns 1) Law governing the transfer of administrative functions in the sector of outer space activities; 2) Law governing the transfer of responsibilities for space activities as well as 3) Satellite Data Security Act.

[40] Spanish legislation only covers the registration of space objects through the Royal Decree 278/1995, dated 24th February 1995, establishing in the Kingdom of Spain of the Registry foreseen in the Convention adopted by the United Nations General Assembly on 2nd November 1974.

[41] Poland has only implemented the act governing the Polish Space Agency (ct of 26 September 2014 creating the Polish Space Agency (POLSA) (as amended in 2019). Nevertheless, a draft of the Law on Space Activities and Registration of Space Objects in 2017 and 2020 has been drawn up. Work is currently underway to implement the Polish Space Act into the legal system based on recently published draft of space Activities act from 14 of May 2025.

[42] Englender, D. (2021) ESA National Space Legislation – Purpose and Scope. Lecture delivered at the ESA/ECSL Executive Course on Space Law and Regulations, November 2021. European Centre for Space Law (ECSL).

[43] Adopted in 2019 by The Hague International Space Resources Governance Working Group.

countries are another element found in this chapter. The final aspect is the *de lege ferenda* proposals for countries wishing to introduce space regulations, especially from the CEE region.

## Chapter 4

This chapter examines the evolution of the space sector in Central and Eastern European countries and how this has driven the need for national space legislation. It will explore space programs from the Iron Curtain era, detailing their unique characteristics, and then analyze the paradigm shift brought about by the European Space Agency Enlargement process in the CEE region. This transformation clearly demonstrates the direct impact on the introduction and development of national space laws, evidenced by recent legislation in Slovakia, Slovenia,Greece and Poland's draft Space Activities Law.

Since the establishment of the European Space Agency, the space market on the European continent has changed its direction, placing Europe as an important player on the international stage and developing the capabilities of individual countries in the field of space. Thanks to the activities of the ESA, the European space sector can boast of having the appropriate technological resources and tools that make up key space missions [44]. It also has autonomous capabilities for new generation launching capabilities.[45] Without participation in ESA space programmes, the country would not have independent access to large space projects and contracts, and the prospect of obtaining them encouraged countries to take action at national level.. Consequently, there are various support instruments for space sector stakeholders depending on the country, including various types of business incubators, such as European Space Agency Business Incubator Centers ESA BIC

. The Iron Curtain, which historically divided the Eastern and Western blocs, highlighted the differences between European regions, including in the field of space activities. The period of the Soviet Union's existence was the main period determining the space activities of most Central and Eastern European countries, especially those operating under the Interkosmos programme. Over the years, however, each country has developed its own specialisations in the management of space activities, financing mechanisms, expertise and political and economic

[44] The Programmes such as EGNOS, Galileo and Copernicus.
[45] Fiott, D. (2020) The European space sector as an enabler of EU strategic autonomy. Belgium: Directorate-General for External Policies of the Union (European Parliament). Available at: https://www.europarl.europa.eu/RegData/etudes/IDAN/2020/653620/EXPO_IDA(2020)653620_EN.pdf (Accessed:30.08.2025).

support.[46] The gaps in the space sector in Central and Eastern Europe relate to the lack of awareness among local authorities about the potential of space and the prioritisation of the space sector. These differences also relate to the relatively low level of public and private investment in the space sector, as well as the low level of cooperation between institutions and industry.[47] Another important factor is the lack of space regulations at the national level, which, however, is slowly changing. From another perspective, the CEE region may increase its importance on a European scale because it is characterised by very high innovation potential and good, well-established international cooperation.

Nevertheless, the Central and Eastern European Region is characterised by high potential in terms of innovation and well-embedded international cooperation which gives it a good chance of increasing its importance at the European scale. For the purposes of this dissertation, the countries of Central and Eastern Europe are classified on the basis of the so-called Three Seas Initiative, which is a forum of 13 countries in Central and Eastern Europe whose territory is located between the Adriatic, Black and Baltic Seas. These countries include Slovenia, Slovakia, Romania, Poland, Lithuania, Latvia, Hungary, Greece, Estonia, Czech Republic, Croatia, Bulgaria and Austria. Most countries in the region lack adequate space sector regulations. This dissertation uses them as examples for nations seeking to regulate space activities. Due to limitations, the analysis focuses on select countries, representing the regional context i.e. Slovakia, Slovenia, Poland and Greece.

## Chapter 5 – Conclusions & Postulates

The space sector has undergone a visible transformation, shifting from the government-dominated *Old Space* model to the growing commercial *New Space* era. This escalating commercialization has fundamentally reshaped the space landscape, propelling the global space economy with projections reaching $1.8 trillion by 2038. Nevertheless the evolving space ecosystem, increasingly shaped by private actors and advanced technologies, demands an adequate regulatory solutions.

[46] European Space Policy Institute (2014) ESA Enlargement: What Interested Countries Can Do to Prepare Themselves for Ultimate Accession – With a Special Focus on the CEE Region. ESPI Report 47. Vienna, Austria: European Space Policy Institute. Available at: https://www.files.ethz.ch/isn/176962/ESPI_Report_47.pdf (Accessed:30.08.2025).
[47] Bukała A., Malinowska K.,and Szwajewski M. (2022).

The *Corpus Iuris Spatialis*, present unique characteristics in international law due to their complex negotiation processes, the significant legal status afforded to international organizations, and states' unprecedented acceptance of absolute liability for space activities. This framework, established during the Cold War period, effectively governed a state-dominated space environment. Nevertheess, the *New Space* Era has exposed critical needs in this traditional framework. The absolute state liability for private commercial activities creates a disproportionate burden, hindering equitable risk distribution. Furthermore, existing treaties inadequately address liability for damage to the space environment and lack robust prevention mechanisms, which is crucial given the growing concerns about space debris and orbital congestion. The "once launching state, always a launching state" principle also creates legal uncertainty for emerging activities in outer space such as space debris removal or the increasingly complex international relations in the chain of space activities.

National space legislation plays a crucial role in the stabilisation and development of the space sector, mainly through the implementation of international obligations under the *Corpus Iuris Spatialis*. The functions of economic law, which interact with the space law, may include the authorization and ongoing supervision of space activities, the maintenance of national registers of space objects and the regulation of liability for damages.

For national space legislation to fulfil more than a control or steering function, a broader examination of the elements of the space economy is necessary. Current national legislation focuses mainly on upstream (i.e. launch, orbital operations and deorbitation activities), with less regulation of production processes or the use of downstream data and services. However, it should be borne in mind that these regulations should also take into account their potential impact on segments not directly covered by the Act, i.e. satellite services (downstream) and non-space activities which, however, are affected by the space sector. In achieving this objective it is necessary to properly formulate regional and national space strategies and programmes, which are key to guiding the development of the sector. These often include promoting initiatives, fostering international cooperation, investing in human capital through research and education, supporting industrial research and development (R&D) activities and establishing long-term funding mechanisms for commercial projects. The growing emphasis on robust space legislation within these strategies, particularly in Central and Eastern European countries, underlines its role in encouraging sector development and responsible behaviour.

The key to effective rulemaking is thorough consultation with all space stakeholders - from scientists to industry, investors to end users. In this way, regulations can be optimally adapted to the needs and dynamics of the evolving space ecosystem. Continuous dialogue

between the public and private sectors contributes to ensuring that the proposed regulations accurately reflect the actual needs of the market.

As already mentioned national space laws primarily serve to implement international commitments under the *Corpus Iuris Spatialis*, ensuring state accountability for space activities. This includes frameworks for authorization, continuous supervision, national registration of space objects, and liability for damages. By integrating these principles, national legislation fosters responsible and sustainable space operations, contributing to both domestic and international safety through the enforcement of best practices, such as collision avoidance and debris mitigation. The specific regulatory approach, while adhering to international norms, remains at the discretion of individual nations, tailored to their market demands and national priorities.

Effective national space legislation is built upon a threefold foundation: adherence to international obligations, responsiveness to national sector needs, and incorporation of global best practices, particularly in technical standards. This results in "Building Blocks" that define scope, establish authorization and registration procedures, set liability frameworks, and integrate country-specific development clauses. This tailored approach allows nations to support an environment conducive to their domestic space industry while upholding international safety and sustainability standards.

Beyond fulfilment of international obligations, national space legislation plays an important role by incorporating clauses to support the development of the sector. These clauses, aim to foster indigenous space sectors by providing mechanisms like adjusted insurance requirements (i.e. Slovenia), space resource ownership (as seen in the Luxembourg), and regulating emerging activities such as suborbital flights (e.g., in the UK). These provisions, tailored to each nation's unique industrial capacity and geographical considerations, are crucial for creating a legal environment that incentivizes investment, facilitates innovation, and enables domestic industries to compete effectively in the global space ecosystem.

Each of the analyzed countries of Central and Eastern Europe, i.e. Slovenia, Slovakia Greece and Poland has enacted or will possible enact in the case of Poland, specific provisions to mitigate the environmental impact of space activities, therefore extending the general principles of international space law. This demonstrates commitment and a visibly effective approach to the problem of environmental protection in outer space , which is a global challenge.

Slovenian legislation is particularly innovative in its approach, primarily due to the explicit inclusion of procedures to limit the creation of space debris in the definition of “space

activities." As a result, environmental protection is not treated as an additional requirement, but as an integral part of what constitutes a space mission in accordance with the law, thanks to a precise definition. The law further reinforces this commitment by explicitly referring to UN Guidelines on Space Debris Mitigation as a condition for obtaining a license. The requirement for the ministry responsible for the environment to issue an opinion on the potential negative impact of a mission is crucial, giving environmental authorities direct oversight. Finally, the obligation to report incidents posing a threat to the environment to the ministry reinforces a sense of responsibility among operators. The adoption of a clear and understandable definition of space activities by Slovenia, which includes the issue of space debris, contributes to better identification of threats and, consequently, to a more effective approach to space environmental protection.

Slovakia's approach is similarly comprehensive and stands out for its definition of space debris as "non-functional and useless space objects or their parts," which provides a clear legal basis for their regulation. The law also connects environmental protection directly to the licensing process, requiring operators to demonstrate measures to minimize space debris and pollution. In addition, the Slovak law introduces a robust system of penalties, with fines ranging from €5,000 to €50,000. This approach represents an effective financial instrument for ensuring compliance with the regulations and shows that Slovakia is serious about enforcing environmental regulations by operators.

Poland's space law, which is currently in the drafting stage, also places great emphasis on environmental protection, incorporating it into definitions and rationales relating to space activities. It defines the concept of "space debris" and "removal of space objects" providing a clear legal framework. The draft law recognizing the long-term sustainable use of outer space as a key basis for justifying space activities, emphasizing the need to eliminate or minimize any negative impact on both the space and terrestrial environments. It requires operators to include descriptions of their plans for space debris mitigation and deorbiting aspects in their license applications, thus underlying the importance of preventive and mitigation measures.

The Greek regulatory framework for space activities mandates comprehensive environmental protection throughout a mission's lifecycle, from licensing through to post-launch and operational phases. This legislation requires periodic reporting and environmental impact assessments to monitor the effects of space activities on both the terrestrial and outer space environment Compliance is based on complying to national, international, and European standards and established good practices.

Slovak, Slovenian, Greek regulations, as well as the draft Polish law, present a modern and comprehensive approach to national space legislation in terms of environmental protection in view of sustainable development of outer space concept. These countries not only fulfill their international obligations in this way, but also introduce additional legal mechanisms to address the environmental challenges associated with space activities. Their actions consist primarily of incorporating environmental protection into legal definitions, making explicit reference to international guidelines, involving environmental protection authorities, and establishing clear sanctions. This creates a well-established, clear, and enforceable legal framework.

This trend suggests that future national space regulations will increasingly move toward a model in which environmental protection is not a secondary issue but a fundamental pillar of responsible space exploration.