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Synopsis of a doctoral thesis entitled

„Legal and international aspects of country functioning in space”

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The predominant goal of this dissertation is to examine whether the international space law in its current form is capable of regulating multilayered undertakings performed in space. The major research problem has been formulated in the form of a question of whether or not international public law, including international space law, incorporates proper and sufficient regulations that would be able to ensure a proper level of space protection and cover undertakings performed within its scope with regard to securing it against destructive activities of various countries. The destructive effect of the utilization of new technologies on both Earth and space as such has remarkably impacted the author and resulted in the formulation of the abovementioned hypothesis. Within the scope of the dissertation, forms of operations performed in space and space itself - the protection of which is extremely important to also secure interests of individual countries and people - are being analyzed. Such a concept has allowed for the identification of a research field and analysis direction, which is focused on the validity of protection of both space and undertakings performed there.

Such a topic of analysis has become the starting point for the realization of several research tasks. The paper presents three major problems and challenges space law has to face: technological development allowing for the introduction of increasingly more innovative forms of undertakings that can be performed, economic development connected with the commercialization of space, as well as the proper protection of both the Earth and cosmos as such. To solve the major research problem, answers to the following auxiliary research questions, being partial research problems, have had to be found: May any of the fields notably impact the change of the currently applicable law regulations and if not – what will be the future of the international space law? Does the development of satellite-based technologies also ensure the safety of their users? May space mining develop basing on the currently applicable international law? Does international law include instruments facilitating the protection of

space-oriented environment against expansive space undertakings? Will the implemented space demilitarization act be enough to prevent future conflicts in space?

The aim of the author is to highlight the importance of problems emerging in connection with the performance of various new undertakings in space. The goal of the dissertation is not to engage in a critique of the currently applicable regulations, but rather to point to vital flaws thereof that may lead to notable consequences with regard to the exploitation of space. One of the goals of the paper is to draw attention to the necessity of launching certain actions that would result in limiting lawlessness that is connected with the current space-oriented activities.

The dissertation is divided into six main chapters. The very first of them presents the development of space law and provides a legal and historic analysis that is of key importance, especially from the point of view of creating international norms. Within said chapter, key terms that are later on used in the remainder of the dissertation are defined. Definitions are provided basing on international public law and international space law doctrines. The chapter also presents basic issues connected with space, touches upon the notion of space itself, as well as covers its unique status by referring to the uniqueness of the international maritime law and the status of Arctic. The authoress additionally discusses delimitation of space and theories allowing for specifying the borders of space therein as well.

Chapter two aims at the presentation of technological development through the prism of two major forms of undertakings performed, namely – telecommunication and satellite-based remote sensing. The chapter in question presents the basis for functioning of the both aforementioned forms in the currently applicable treaties and other international acts. The goal of the chapter is to showcase new technologies that may to a significant extent impact activities executed in space that may in turn have notable consequences on the life on Earth and interfere with the space as such.

Chapter three is devoted to the issue of economic development, with the major point of focus being asteroid mining. Focusing on the issue of gathering resources from celestial bodies and the Moon has required the specification of their astronomical and legal status that is touched upon in said chapter, mainly in the form of presentation of various doctrine-related views and the so-called *res nullius* analysis. The authoress additionally presents types and ways of extracting natural resources from celestial bodies. Individual principles and norms of international space law in relation to the aforementioned new form of operation are analyzed therein as well. The focus is also put on the possibility of performing such undertakings basing on the rules of the freedom of scientific examination, ban on appropriation, demilitarization,

peaceful use, protection of the environment of celestial bodies, and the concept of humanity's common heritage.

Chapter four is oriented towards the issue of ecological safety of the space that can be achieved by protecting its natural environment (*space safety*). In the case of this chapter, focus is put on showcasing the major source of contamination being space waste. Afterwards, space-related treaties, common law, and soft law principles are analyzed in the attempt to find norms protecting space environment.

Within the framework of the fifth chapter, the authoress presents the issue of military safety of the Earth that is guaranteed thanks to space undertakings (*space security*). The content of said chapter incorporates the analysis of principles on peaceful exploitation and demilitarization of space in space treaties, two-party agreements, and soft law. The authoress also dwells upon the ban on using force and performing military undertakings in space. In each of the chapters, aside from theoretical considerations that are presented basing on the applicable doctrines and practices of selected countries, current problems connected with every undertaking type are provided, together with the specification of threats connected with them.

A conclusion that can be drawn from the dissertation is that basic principles regulating both the exploration and management of space were implemented by adopting the Space Treaty that has been the most fundamental act in this regard. For fifty years, the treaty has ensured the safety of undertaken space-related operations, but it is not the case currently. It is caused, inter alia, by an unstable geopolitical situation, technological development, an increasing number of activities performed by space-related entities, as well as by the increased number and type of the latter. The nature and complexity of space operations have a notable impact on the course of space undertaking management. Unfortunately, it is therefore difficult to cover by the currently applicable legal system. The international society, in the course of exploring space, developed several treaties regulating humankind-wide operations in space. While combined, they became the basis for the so-called *Corpus Iuris Spatialis*. The discussed treaties, at the moment of their creation, included innovative concepts and solutions that were aimed at regulating activities that should have been performed by humans within unexplored areas. Unfortunately, said regulations became ill suited to contemporary times quite quickly and were rapidly overshadowed by technological development. That is why the applicable norms should convey a message that would be better suited to the current situation and the current specificity of space-related undertakings. The authoress draws a conclusion that the international space law will keep developing in the direction of soft law-based norms.

Within the scope of the paper, it is indicated that it is important for the international space law to have the greatest scope possible, which should cover all new aspects that may emerge, such as new technologies, business opportunities, public and private partnership, etc. To achieve that, it is required to develop a just and constant international order that would aim at facilitating common goals. Adopting such a solution would be possible thanks to the implementation of a global management system that would be based on international law system and would serve common interests. Upcoming technological advancements, various activities that have never been opted for performed by various nations, as well as the failure to comply with the current treaties lead to the conclusion that there is the need for consultations and initial negotiations in order to develop new legal solutions with regard to international law.