UDC 341.1/.8
DOI: 10.31359/1993-0909-2023-30-4-75

Daria A. Bulgakova
Law Faculty
University of International Business and Economics (UIBE)
Beijing, People Republic of China

Valentyna A. Bulgakova
Gymnasium No. 91
Kryvyi Rih, Ukraine

THE RECOGNITION OF BASIC NON-ASTRONAUTS NEEDS DURING COMMERCIAL SPACE FLIGHTS

Abstract. *The presented study connects international space and intellectual property laws aiming to support space tourism industry in the challenges of commercial spaceflight. The article seeks to recognize and address the basic needs of non-astronauts by calling for a legal framework to protect the basic needs of space tourists by recognizing them. The authors, applying the methodology of Maslow's pyramid and the UN' circle of sustainable development, propose firstly to determine the basic needs by isolating auxiliary elements, namely: (1) the origin of needs, (2) the client, (3) the basic needs of a person in space, (4)) sides of «touch» and (5) the territory of weightlessness. Based on the results of the research, the authors concluded that a sustainable cycle of exchange and interaction of these elements not only depends on the triad of basic human needs in space itself but also forms an effective legal turnover between (a) international law, (b) intellectual property law and (c) space tourism, which is necessary for the stability and consolidation of needs with subsequent settlement accordingly. At the same time, the main needs of non-astronauts, according to the authors, should be recognized not only from a legal point of view but also through the development of innovations designed specifically for certain needs of space tourists. This position is affirmed by the results of the social experiment, which, in addition, demonstrate not only the importance of the developed key elements but also prove the need to pay attention to innovations for quality service of the basic needs of space tourists and their satisfaction accordingly.*

Keywords: *outer of space, space tourism, fundamental human needs, Maslow's pyramid, sustainable development of the UN.*

Дар'я Анатоліївна Булгакова
Факультет Права
Унівесритет Міжнародної Економіки та Торгівлі
Пекін, Китайська Народна Республіка

Валентина Анатоліївна Булгакова
Криворізька гімназія № 91
Криворізької міської ради Дніпропетровської області
Кривий Ріг, Україна

ВИЗНАННЯ БАЗОВИХ ПОТРЕБ НЕАСТРОНАВТІВ ПІД ЧАС КОМЕРЦІЙНИХ КОСМІЧНИХ ПОЛЬОТІВ

Анотація. *Представлене дослідження пов'язує міжнародне законодавство про космос та законодавство про інтелектуальну власність з метою правової підтримки індустрії*

космічного туризму при викликах комерційних космічних польотів. Стаття має на меті визнати та задовольнити основні потреби людей, які не є космонавтами, закликаючи до впровадження правової бази щодо захисту базових потреб космічних туристів шляхом їх визнання. Автори, застосовуючи методологію піраміди Маслоу та кола сталого розвитку ООН, пропонують спочатку визначити базові потреби шляхом виокремлення допоміжних елементів, а саме: (1) природа походження потреб, (2) клієнт космічного туризму, (3) основні потреби людини в космосі, (4) сторони «дотику» та (5) територія невагомості. Враховуючи результати дослідження, автори дійшли висновку, що стійкий цикл обміну та взаємодії зазначених елементів не лише залежить від тріади базових людських потреб у самому космосі, а й формує ефективний правовий оборот між (а) міжнародним правом, (б) правом інтелектуальної власності та (в) космічним туризмом, який є необхідним для сталості, та закріпленості потреб з наступним урегулюванням відповідно. Водночас основні потреби некосмонавтів, на думку авторів, повинні бути визнаними не лише з правової точки зору, а й шляхом розробки інновацій розроблених спеціально для тих чи інших потреб космічних туристів. Така позиція підтверджується результатами проведеного соціального експерименту, які й, окрім того, демонструють не лише важливість розроблених ключових елементів, а й доводить необхідність у приділенні уваги до інновацій для якісного обслуговування базових потреб космічних туристів та їх наступного задоволення.

Ключові слова: *космос, космічний туризм, фундаментальні потреби людини, піраміда Маслоу, сталий розвиток ООН.*

INTRODUCTION

The rapid development of space flights is bringing spacecraft speed on par with advancements in science of law, technology, and astronautics. This progress has led to a growing demand for space tour competitions such as the X-Prize, and the establishment of dedicated space tourism companies such as Space Adventures Inc., Virgin Galactic, and Bigelow Aerospace. There has also been a surge in the development of technology designed specifically for space tourists and innovative hotel projects, such as the Galactic Suit Space Resort by Galactic Suit Limited, the Bigelow Expandable Activity Module by Bigelow Aerospace, and the Aurora Station by Orion Span. Space Adventures Inc. provides a service of flights to orbit, such us commercial space flight with two non-astronauts in late 2021. Moreover, NASA has contracts with SpaceX, Orbital ATK, and Sierra Nevada to resupply the International Space Station (ISS) with supplies until 2024. All these developments signify that space tourism is no longer a far-fetched idea but an established sight-seer destination.

The ongoing processes are transforming the traditional understanding of tourism and how it is perceived. Space is now accessible to all Earthlings, and the term space tourism has been coined to describe the phenomenon of flights to outer of space with non-astronauts. However, while the novel is widely used, it is not entirely legal, and there are controversies around private human flights labeled as space tourism [7]. Consequently, the space tourists are in need to recognize them basic human essentials to be met during journey. The research seeks to review basic human needs as space tourism

is a consumption phenomenon that significantly impacts these needs in outer of space environment.

Basic human space needs must be met to satisfy the demand of space travel. For instance, customers must undergo physical and medical testing, and appropriate technological conditions, as demonstrated by MirCorp's testing flights for D. Tito. However, Mir had to be de-orbited during Tito's preparation, which occurred over the Pacific Ocean in March 2001 [13]. Some people are interested in experiencing cosmic existence word-for-word, becoming direct participants and discoverers of new unexplored expanses, which is why there is a permanently inhabited ISS ruled according to the Cooperation Agreement among the government of Canada, governments of the Member States of the European Space Agency, the government of Japan, the government of the Russian Federation, and the government of the United States of America concerning cooperation on the civil ISS (2001).

The legal and innovative challenges posed by private space flights raise concerns about the securing of non-astronauts during their stay in outer space. The consideration of this issue demands to innovative intellectual developments and regulatory update. One possible approach is to illustrate that innovations and relevant international law can be decoded by analogy with the regulation of the law on travel and implementation of policies for specific tourist services packages [8]. Therefore, it is crucial to develop international standards and norms that protect their rights, interests, and freedoms. This development should regard not only the economic potential of space exploration but also the social implications and philosophical considerations involved. In the view of the study, Maslow's theory of fundamental human needs offers a valuable framework catering to the specific basic needs of non-astronauts [12]. On the other hand, the United Nations (UN) course to recreate the plot of private commercial space flight industry gives a guideline for identification non-astronauts interests, proclaiming space stability and sustainable development protecting space from overall governance by private entities, contributing for the exploration by the godsend of humanity, and patrolling against potential detriment [10]. For instance, expansions have demonstrated that Germany and Italy have expanded their national legislation protecting inventions through patents to cover inventions created on the European module of the ISS (Balsano & Wheeler, 2006).

It is indispensable to regard the international rules and policies that must be designated to hold the outbreak of private space flights to guarantee space stability and protection against potential harm. It ought to be clarified how international law works since existing space law cannot answer questions about space tourism simply because of the long-standing legislation [7]. Extant space law, which has been in position for an extended time, cannot provide answers to inquiries about space tourism; hence, it is pressing to appoint rules and regulations to handle the legal and innovative subjects enveloping space tourism, specific to the commercial aspect of private space flights, that can encounter the psychological and other deficiencies of non-astronauts, techno-

logical headway, and motivations of the industry. Significantly, it is emergency to adopt rules counterbalanced to those that we have, for example, the code of conduct on the ISS, but also norms relevantly to the commerce, since the commercial segment is the main [13]. However, under the research article idea, more than the code of conduct is needed to regulate space tourism. Deficiency-specific rules shall consider the commercial segment as the main component when it is necessary to create intellectual property regulations tailored to space tourism's unique demands while adhering to established international laws and policies. Theoretical approaches shall build the model of general international rules applicable for the way forward of flights with non-astronauts from the side of conditioning different areas of law, for example, security law, liability law, intellectual law, property law [9]. Accordingly, outer of space is portrayed as a habitat where general ordinances are vital to guide the expanse of space for non-astronauts' activities to different extents for international law and intellectual property all together.

Authors hypothesise that materialising an interplanetary act that includes specific space rules and sector-specific directions is necessary to assure compliance with international and intellectual property laws on a global scale. The interplay of legal doctrine suggests that such an action is needed to govern interplanetary property law systems [15] where the analogy with the economy is crucial to articulate intellectual property law criteria of innovative developments. Nonetheless, these rapid changes significantly impact the implementation of intellectual property law into the space tourism industry, especially when space visitors exploring outer space may abuse the right of ownership of space objects [3]. Widgerow [15] argues that existing laws are inadequate for the emerging phenomenon of non-astronaut getaways cultivating property in outer space and must be completely overhauled. Important fact, private companies are developing faster than the current legal framework can accommodate commercial space flights phenomenon, so inaugurating a legal foundation is essential before private space flights can proceed. Yet, more than a doctrinal approach to legal changes should shield the progress. Additionally, an apprehension of the legal status of property in outer space, and the property rights of space tourists during pre-flight, in-flight, and return stages, boosts a serious recommended further discussion on property in space [4].

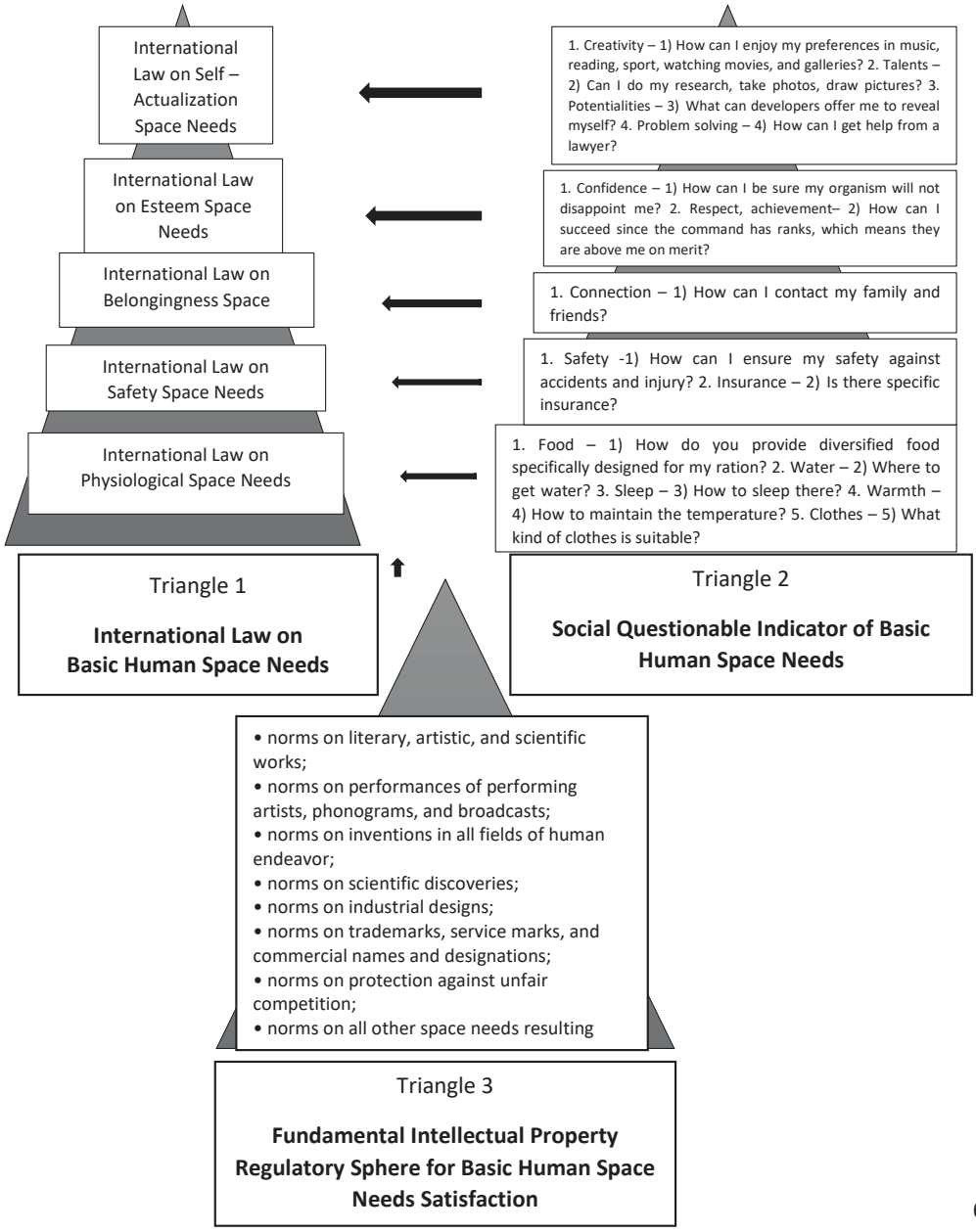
A comprehensive and empirical approach to law changes is essential to avoid potential legal complications. Hence, the research breakdowns the idea that space will be fully open to non-astronauts. However, the founders shall bear reasonable attention to the international rules and policies that must be developed to regulate the outbreak of private space flights. While advancements in technology and the emergence of space tourism raise questions about how international law will adapt, authors offer to establish a scholarly designed framework for enforcing international norms related to private space flights. This requires understanding the interaction and relationship between international law, intellectual property law, and the space tourism industry respectively

to the essentials that shall be met during space tourism. Thus, the goal of this study is twofold: (1) examination of the interaction between international law, intellectual property law, and space tourism according to the challenges posed by private space exploration, and (2) structurization of the proposal oriented for innovative practically frameworks through the social experiment targeted to find out the enforcement way in recognition of basic non-astronauts needs. The manuscript proposes the creation of a standardised set of international laws referring to the intellectual property law regulatory sphere. By demonstrating the connection between international law and intellectual property law in relation to outer space activities, this study improves comprehension of specialised knowledge about private commercial space flights involving non-astronauts and recognises their basic needs for further regulatory implementation.

1. MATERIAL AND METHODS

To better understand the legal direction to satisfy the basic needs of non-astronauts, including their rights, freedoms, and interests, the article offers to regard a methodology of boundaries that examines their motivations and behaviors. This approach was utilized by a study concerning the social and legal aspects of human behavior in outer space obtained through the interpretation of Maslow's Pyramid of needs which outlines five basic human needs: physiological, safety, belongingness, esteem, and self-actualization. The primary research hypothesis is that human beings have physiological needs that must be addressed during commercial space flights. These needs are structured in a pyramid when the satisfaction of lower needs is a prerequisite for meeting higher ones, or on the way of another, higher-level can only be satisfied once lower-level needs have been fulfilled. This article proposes to use logical analogy and parallels applying Maslow's Pyramid of needs to recognise basic needs of non-astronauts. The research priority is the physiological needs of space tourists to clarify what is demanded for the legal protection. Accordingly, the research design presents a coherent and comprehensive plan for addressing the legal challenges associated with commercial spaceflight while acknowledging the distinctive challenges and opportunities inherent in this field. The authors assert that the principles of behavioral motivation and corresponding needs that underpin the international law are akin to the fundamental requirements that must be fulfilled in space. Scholars contend that this makes the intellectual property law applicable to space activities and enables the development of appropriate regulations for space exploration that promote the welfare of all individuals involved, including non-astronauts. Furthermore, the authors argue that creating legal frameworks to incentivise investment in innovative and creative space activities has significant societal benefits. The authors believe this course is consistent with the UN overarching goal of sustainable development advancing the common good.

Furthermore, sociological experiments were led by Daria Bulgakova on December 13, 2019, at the Law Faculty, University of International Business and Economics (UIBE) in Beijing (China) in the framework of the workshop 'EARTH-SPACE-EARTH



6

Figure 1. Triad of International Law, Human Basic Space Needs, and Intellectual Property Law
Source. Prepared on the basis of research data by authors Bulgakova Daria & Bulgakova Valentyna

(ESE) TRIP' and focused on the analysis of commercial space flights with (perspective) non-astronauts offering insights to the problem. Additionally, while a variety of definitions throughout the project, it is proposed to refer the acronym ESE trips to commercial space flights including (but not limited to) orbital and (or) suborbital space flights, human space flights, space flights to ISS, Moon, and Mars, round way space flights, commercial and (or) private space flights, space tourism, and other manned space activities. Using this approach, the authors explored the legal implications of space exploration from multiple perspectives, including social environment and those potential space tourists.

The empirical study presented in Figure 1 was generated applying Hegel's dialectical triad of thesis-antithesis-synthesis for the demonstration of initial idea (the thesis), identifying its opposing viewpoint (the antithesis), and reconciling these opposing perspectives through synthesis.

The authors employed this method to develop three interconnected triangles that examine various legal requirements for non-astronaut outer space activities. The study presents three interconnected triangles exploring legal requirements for non-astronaut outer space activities. These triangles proffer a comprehensive empirical result for generating regulatory norms that safeguard non-astronauts' basic human needs during commercial space flights while advancing space exploration. The first triangle, the Triangle of International Law on Basic Human Space Needs, embodies the thesis and aims to establish a legal framework to protect non-astronaut rights and interests in space, including safety, privacy, and medical care. The second triangle, the Triangle of Social Questionable Indicators of Basic Human Space Needs, represents the antithesis and identifies and addresses broader social and ethical implications, such as environmental impact and resource distribution. Its goal is to identify and address potential unmet needs and confirm that the legal framework developed in the first triangle incorporates them. It examines the intellectual property markets that arise in the context of human space travel, such as protecting inventions, patents, and copyrights. Its objective is to develop a legal framework that safeguards the intellectual property rights of individuals and companies involved in human space travel and fosters innovation and progress in this field.

In Figure 2, the researchers employed a cyclical circle methodology based on the UN's theoretical model of sustainable space development concepts. This methodology is built upon three dimensions of sustainability: economic, social, and environmental. The geometric circle shape was used as the analogy method in the ratio of the economic circle. Additionally, the method of equivalent relations was employed to relate sustainable development to the circle model which visually illustrates the interconnectedness of the different aspects of sustainable space development being cyclical and ongoing. Furthermore, the analogy method used in the economic circle ratio highlights the economic aspects of sustainable outer space development, such as the use of resources and the creation of value. The method of equivalent relations is also employed

to relate sustainable development to other fields and areas of research, such as environmental sustainability and social responsibility enabling us to understand and analyze sustainable space development's interconnected nature.

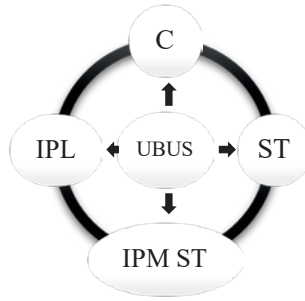


Figure 2. Sustainable Intellectual Property Law & Space Tourism Exchange
Source. Prepared on the basis of research data by authors Bulgakova Daria & Bulgakova Valentyna

The methodology of the fundamental laws of economics applied in Figure 3 consists of several interconnected principles that help explain the economic relationship between interest, demand, offer, acceptance, and intellectual property. The first principle is that if there is interest, then there is a demand. This hints that when people have a desire or need for a particular good or service, they will create a demand for it in the market. Thus, the authors state that there will be a demand for a product or service if there is interest in it. This suggests that consumers (potential space tourist) will be interested in purchasing a product or service if they see its value. The second findings are that if there is a demand, then there is offered. This tells that when there is a demand for a product or service, commerce will sell it to meet that demand. Therefore, the authors view is about there will be an offer if there is demand for a product or service. This implies that businesses will respond to consumer demand by selling goods or services. The third concept is that if there is an offer, then there is acceptance. This represents a fact when a business offers a product or service, customers will accept it by purchasing it. Given this view, if there is an offer for a product or service, then there will be acceptance. This conveys that potential clientele will decide whether to accept the offer based on price proportionate to the quality, and availability. The fourth view is that intellectual property benefits and operates for an offer based on the composing laws of the economy. Commerce can use intellectual property such as patents, trademarks, and copyrights to protect their products and services offering them to interested parties. Thus, intellectual property is an asset for the creation and offer goods and services. The laws governing intellectual property are an important part of the economy shielding the rights of creators and innovators to profit from their ideas and inventions. Thus, Figure 3

about the application of the fundamental laws of economics highlights the interconnectedness of critical economic principles such as interest, demand, offer, acceptance, and intellectual property and their impact on the global economy. Space tourism aids a compelling sketch of the vital role that intellectual property law plays in driving innovation and economic growth of commercial space flights.

Consequently, the connection between fundamental human needs and benefits is closely tied to intellectual property law, as it drives the creation of innovative new products and services. One such model of this is space tourism, which has significant implications for the global economy due to its affinity to the international regulatory sphere, such as the UN Treaty on principles governing the activities of states in the exploration and use of outer space, including the Moon and other celestial bodies (1967), which mandates peaceful exploration and use of outer space. This demonstrates intellectual property law's profound impact on the global economy. In particular, the consumer space tourism market has experienced remarkable growth in recent years and is projected to continue expanding. This growth underscores the need to devise international relations and partnerships at interstate and intergovernmental levels.

2. RESULTS AND DISCUSSIONS

Space tourism is a rapidly growing industry that raises essential questions about the intersection of international law and intellectual property law. International law plays a significant role in space tourism, as it governs the use and exploration of outer space. The UN Treaty on Outer Space (1967) outlines principles for the peaceful exploration and use of space, including the principle of non-appropriation, which states that outer space and celestial bodies are not subject to national appropriation or ownership. This means that commerce must adhere to international law when doing business in space. As more companies seek to offer space tourism services, it is vital to understand how to satisfy the basic space needs of potential tourist, and how international law interacts to meet innovations and what role intellectual property law plays in the industry. It is because these developments represent a significant strive for the legal course oversight of the satisfaction of perspective space tourists' consumption checklist of concerns since the lack of legal guarantees potentially could affect journey achievements in happiness, and thus requires urgent attention [1, 5]

International law provides a foundation for the peaceful exploration and use of outer space, while intellectual property law helps to foster innovation and protect the investments of space tourism companies. In the view of Goldsmith and Rees [5], the funding of crewed voyages should be left to billionaires and private sponsors. These funders can then launch thrill-seekers on cut-price voyages that would carry a greater risk than publicly funded NASA could impose on civilians. It is believed, intellectual property law impacts the development of space missions with non-astronauts by providing incentives for innovation. For instance, exclusive rights can encourage them to invest in new technologies and services. On the other side, commerce while investing

in space tourism shall receive a guarantee in protecting company's intellectual notations, likewise, to patent a new spacecraft design or trademark a logo for its services. As the industry continues to grow, it will be necessary for policymakers and industry leaders to work together to ensure that legal frameworks support the growth and development of the space tourism industry, and at the same time protecting stakeholders' interests.

In order to address the study first target of how international law interacts with space tourism and what role intellectual property law plays in the industry, as well as the second target is to clarify the orientation for further implementation through the identification of basic non-astronauts needs during commercial space flights since the fact that a large amount of people would have to spend their time there would ultimately lead to the adaptation to it [6, 33]. Thus, the authors propose to look on the results displayed below.

2.1. International Law & Intellectual Property Law & Space Tourism Via the Shape of a Triangle

2.1.1. Proposal on the Origin element in the landscape of commercial space flights

The 'origin' element is intimately connected to the concept of the 'Overview Effect,' which was coined by philosopher and space writer Frank White [14]. This unique experience helps to clarify the transformative nature of viewing the Earth from space. In an instant, the observer realizes something that we all know but rarely experience firsthand: the Earth is a single system, and we are all interconnected. This realization brings a sense of unity and coherence to the individual's outlook on the world. Many astronauts have experienced the power of the 'Overview Effect' firsthand, and it has had a profound impact on their understanding of themselves and their place in the world. By encountering the Earth from a distance, individuals gain a new perspective on the fragility and interconnectedness of our planet. This realization can inspire greater responsibility and care for the Earth and its inhabitants, emphasizing the importance of unity and interconnectedness in our approach to global issues. The 'Overview Effect' provides a new lens through which to view our planet and our place within it, inviting us to consider the impact of our actions and the importance of preserving the Earth for future generations.

In the context of commercial space flights, the 'Overview Effect' takes on added significance. As more and more individuals could experience space travel, we have the potential to create a profound shift in our collective understanding of the Earth and our place within it. By encountering the Earth from a distance, commercial space travellers can gain a new perspective on the fragility and interconnectedness of our planet. This realization can inspire a greater sense of responsibility and care for the Earth and its inhabitants, as well as a deeper appreciation for the importance of unity and cooperation in addressing global challenges. The 'Overview Effect' can also serve as a powerful reminder of the impact of our actions on the planet. As we continue to push the boundaries of space travel, it is essential that we do so in a way that is sustainable and mind-

ful of the Earth's limited resources. Hence, as the space tourism industry continues to mature, it becomes increasingly crucial to comprehend the legal frameworks that govern it. Among the components of this legal landscape are international and intellectual property laws where both rely heavily on the 'origin' to determine jurisdiction and ownership in space activities. In international law, 'origin' refers to the nation or state responsible for a particular activity or object in space. Such activities may include the launching of spacecraft, deployment of satellites, and the extraction of resources. The concept of 'origin' plays a vital role in international law by aiding which country or entity has jurisdiction over a particular activity or object. The concept of 'origin' also has significant implications for intellectual property law. In this context, 'origin' directs to the individual or company that creates or invents a distinct technology, product, or service. Accordingly, it is determining who holds the intellectual rights to property related to space activities. By developing a comprehensive understanding of the 'origin' element in the legal landscape of space tourism, we can ensure that this industry continues to thrive. Given the critical role of the concept of 'origin' in determining jurisdiction over space activities and intellectual property protection for space-related technologies, it is crucial to establish clear approaches and protocols for its application in the space tourism industry. Such guidelines can define which countries or entities have jurisdiction over specific activities or objects in space and establish criteria for obtaining intellectual property protection. It is essential that it be governed by a fair and equitable legal framework that promotes innovation and progress. This requires the establishment of precise policies ensuring that the industry operates within a transparent and well-regulated framework. By doing so, we can help to foster a thriving space tourism industry that contributes to the advancement of science and technology for the benefit of humanity.

According to research, the 'Overview Effect' can provide valuable insights into the relationship between international law, intellectual property law, and space tourism. Like the Earth, space is governed by a set of laws that are interconnected and must work in harmony. Intellectual property law is a critical component of this system, as it determines how companies can benefit from their inventions in space. To fully comprehend the complex interplay between these laws and their impact on space activities, it is essential to embrace an experiential approach. By gaining firsthand experience of the 'Overview Effect' and its transformative power, we can better understand the interconnected nature of these elements and how they work together to promote progress and innovation in the field of space tourism. Authors believe, recognising the unity of these laws and their relationship to the 'Overview Effect' can help us unlock new knowledge and insights, paving the way for more sustainable and responsible space activities in the future. By embracing this interconnectedness, we can work towards a more unified and cooperative approach to space tourism that benefits both individuals and the planet as a whole.

2.1.2. Proposal on the Client element

Despite its exploratory nature, this study provides valuable insights into the different roles that individuals may take on within the commercial space flight industry. These roles include explorers, innovators, developers, business partners, investors, space tourists, and third parties. In the context of the study, these individuals are referred to as 'clients' of the space tourism industry. The client component plays a crucial role in the development, improvement, and implementation of international intellectual property laws pertaining to space tourism. The decision of the client to accept or reject space tourism has a significant impact on the industry's growth and development, making it essential to understand the different roles that clients may assume and their corresponding motivations.

The idea proffers to distinguish two categories of Clients:

The first Client, whom the study refers to as Client #1, has articulated interests and needs with specific requests for satisfaction. For Client #1, the paramount concern is the set of Laws of the Universe, while Earth laws are considered secondary. Throughout this paper, the research shall use the term 'Laws of the Universe' to describe a unifying and all-encompassing concept that replaces the inadequate framework of international law, which fails to address legal issues related to space and intergalactic activities. Although there is currently no universally accepted set of Laws of the Universe, the rapid commercialisation of space has led to galactic and interplanetary activity proliferation. Numerous studies have focused on developing international regulations for commercial passenger spaceflight [9]. In this context, the research broadly uses the term 'Earth laws' to encompass all existing international legal acts related to space and intellectual property law.

The second Client, the research refers to as Client #2, has non-specific needs that can be met through existing developments and innovative opportunities governed by Earth laws. While a set of Laws of the Universe may be relevant, it is considered a secondary consideration for Client #2. Earth laws are paramount as they are sufficient to meet this Client's non-specific needs, particularly in space tourism. For instance, Earth laws provide sufficient coverage for space tourism to meet Client #2's non-specific interests. Given the absence of specific needs, no specific requests or offers need to be regulated. Consequently, Client #2 is divided into subspecies:

a) Active Client or Client #2-a – has non-specific needs but specific interests that can awaken specific needs of space tourism. At present, the Clients do not aim to become a direct subject of space tourism, but they do not deny it as a possibility. Primary law satisfies non-specific needs and considers non-specific interests as a condition of regarded laws for absolute satisfaction.

b) Passive Client or Client #2-b – has non-specific needs but with a non-particular interest in space tourism, for example, having some interest due to the novelty of flights. The Client has no intention of becoming a direct subject of space tourism and denies it as a possibility. Primary law satisfies non-specific interests and non-specific needs and does not consider a law.

Consequently, the vision introduced in this study involves differentiating between two types of Clients, each with distinct interests and needs. Client #1 is focused on specific requests related to the Laws of the Universe, which are of primary importance, while Earth laws are considered secondary. In contrast, Client #2 has non-specific needs that can be met through existing developments and innovative opportunities governed by Earth laws. Although a set of Laws of the Universe may be (because it is secondary) relevant for this Client. By understanding these categories of Clients and their distinct needs, the space tourism industry can develop and implement international intellectual property laws that meet their requirements effectively.

2.1.3. Proposal on the Basic Human Space Needs element (for the interpretation of International Law and Intellectual Property Law interaction)

In this article, it is noted that space needs are legally understood as those needs that are caused to satisfy international human freedoms, rights, and interests. In our case, the research justifies space tourists whose legal needs are expressed in rights, freedoms, and interests having the physiological and legally enforced application during ESE flight.

This proposal applies the triad shape in Figure 1, Triad of International Law, Basic Human Space Needs, and Intellectual Property Law. Our proposal uses the triad shape shown in the first triangle, *the Triangle of International Law on Basic Human Space Needs*, resembling the levels of Maslow's hierarchy of needs. Specifically, authors apply this framework to analyse basic human space needs in the context of international law. The triangle results include four key dimensions: physiological, safety, belongingness, esteem, and self-actualization 'pangs of hunger.'

The second triangle, *the Triangle of Social Questionable Indicators of Basic Human Space Needs*, illustrates the relationship between social questions, international law, and space conditions. It shows how society's questions about space needs are preached through the application of international law, represented by two branches: the branch of needs and the branch of proposed international law reflected under the Triangle of International Law on Basic Human Space Needs.

The third triangle, *the Triangle of Fundamental Intellectual Property Regulatory Sphere for Basic Human Space Needs Satisfaction*, answers how intellectual property law could satisfy basic needs through interaction with international law. This triangle highlights the vital role that international law plays in satisfying the needs by regulatory sphere of intellectual property for designated innovations. The present research draws upon the UN's concept of sustainable development of space activity to identify the components of the third triangle. The authors discovered this through a theoretical application, with intellectual property law as an example, and encouraged other researchers to apply this proposal to other branches of law. Therefore, the third triangle synthesizes the first, which focuses on international law, and the second addresses public issues. The resulting triangle provides a comprehensive framework for examining the intersection of sustainable development, intellectual property, and space activity.

Figure 1 has been designed according to the results of the EARTH – SPACE – EARTH (trip(s)) workshop aiming to explore regulations that could meet the basic needs of potential space tourists during ESE trips and propose directions to stipulate in the first place. As a result, triangles in Figure 1 were assembled. Social experiments (panned out in a Figure 1) was conducted with a total of 33 participants from Africa, Asia, Europe, and South America: Seoul, Germany, Uzbekistan, Sierra Leone, Pakistan, Maldives, Ethiopia, Cuba, Sudan, Ukraine, Poland, Serbia, Benin, Austria, Colombia, Nigeria, El Salvador, Mongolia, Tanzania, Beijing, Argentina, Nigeria, Albania, Azerbaijan. The participants diverse perspectives have contributed to a wide range of perspectives on the issue with benefits to inclusive and compelling proposals for a regulatory sphere concerning commercial space flights. The research article proposes some relevant results as follow.

During the 'Phase 2 Main Part' program description, several problematic questions, and tasks arose, which lasted 95 minutes. The tasks included: part three of Phase 2 focused on the issue of 'Woke-up legal risks. How to pretend?' which lasted 20 minutes.

- stipulating all possible risks associated with ESE Trip,
- raising doubts about the safety of space travel, and
- emphasizing the importance of ensuring companies do not mislead consumers with a vested interest in the business.

Part 4 of Phase 2 pertains to the problem of 'ESE Trip insurance – legal failure. How to prevent?' lasts for 20 minutes. This segment includes the following key points: (1) The challenge is that according to the company's policy, service providers do not bear any responsibility and assert that tourists fly at their own risk; (2) The company's policy indicates that they do not reimburse losses or return the money, even if the flight did not occur; (3) Insurance shall address safety, damage issues providing adequate coverage for ESE trips, and being an integral ESE trip component; (4) The complete result, addressing the legal aspects of space tourism insurance, is crucial for protecting the interests and safety of participants.

Part 4 of Phase 2 in a 20-minute tackled the matter of 'Space incapacity. Where are you, lawyer?' ascribing of how the law's value can safeguard the ESE journey. As a result, participants suggested the following steps forward:

(1) Implementation of the human right to claim for a legal assistance;

(2) Address of what happens if a crime is committed against a consumer on the spacecraft;

(3) Determination of the legal process if a consumer commits a crime against the crew;

(4) Discourse of the scenarios such as what if someone knows that the spacecraft will crash within an hour but has not left a will regarding property and other needs;

(5) Outline the steps to contact a lawyer and receive a legal assistance.

The workshop partly utilized, for example, the movie 'Passengers,' a 2016 film directed by Morten Tyldum, and written by Jon Spaihts, to stimulate an experimental

back-and-forth approach among participants. Enforcement of stressed legal aspects in space tourism is crucial to ensuring that basic human needs and fundamental rights are protected and that consumers have access to adequate legal assistance in emergencies. It is essential to acknowledge and address the potential risks associated with space tourism and to ensure that companies are transparent with consumers regarding the package of service and potential hazards of such travel. Consequently, in Figure 1, the socially questionable indicator in the shape of the triangle systematized and raised a compass for adequate regulations under the essential's spectrum of potential space tourists relative to the fundamental requirements. In contrast, the outcome of the third triangle shows concerns of potential space tourists about the sufficiency of international law to ensure their basic needs are met while during outer of space activities and whether there are adequate norms to secure guarantees.

Through empirical discussion, the participants stated that international law must confirm that space tourism is carried out safely and responsibly. Space tourists should be aware of certain critical factors, such as the amount of food and water that will be delivered, whether scientists or trained personnel will accompany them during the trip, guidelines for health problems, and whether the trip can be cancelled under certain circumstances. Moreover, companies shall confirm that customer demands are secured, and passengers shall be fully informed about eating, sleeping, exercise, and facility arrangements. ESE trip service providers should prepare non-astronauts for potentially dangerous situations and provide security measures for departure and liftoff for all parties involved. Those measures must be put in place not only for the flight participants but also for habitats- and material objects in outer space and on earth. Investigating the technology thoroughly before opening it up for service is necessary. Therefore, it is imperative to incorporate international law that implements specific requirements for space tourism.

2.2. Intellectual Property Law on Space Tourism Via the Shape of a Circle

The initiative to guide law for intellectual property law set concerning ESE trips proposes to frame a shape of a circle to address whether the law of economics on offer and acceptance applies to satisfy human space needs in the context of ESE trips. If so, how does intellectual property law guarantee that, and is it a positive or negative indicator?

Intellectual property law recreates a significant role in facilitating the development of space tourism by protecting the rights of those who invest in and create new technologies for this industry. At the heart of the law of economics is the concept of offer and acceptance, which refers to the process by which two parties agree to enter into a transaction. In the context of ESE flights, this can involve offering services or experiences related to space travel and accepting these offers by individuals or groups willing to pay for them. Furthermore, intellectual property law is a critical factor in the development of space tourism, as it can protect the rights

of those who create and invest in new technologies and innovations related to space travel. This includes patents, trademarks, and copyrights, which can guarantee that individuals and companies profit from their inventions and ideas. In this sense, the law in question can be both a positive and negative indicator for the development of space tourism. On the one hand, it can encourage innovation and investment in this industry by protecting the rights of those who create new technologies. On the other hand, it can also create barriers to entry for new players in the market who may need more resources to obtain the necessary patents and other forms of intellectual property protection.

Eventually, the effectiveness of intellectual property law in promoting space tourism development depends on various factors, including the legal framework for ESE trips, the nature of the innovations being produced, and the overall of the economic context where the studied industry operates. In this regard, the research suggests a model, displayed in Figure 2, Sustainable Intellectual Property Law & Space Tourism Exchange, to represent a correlation between human cosmological basic needs and international law exemplified by economic circle. The effectiveness of technique is seen in the concept of sustainable development ensuring that current development meets human needs without compromising the ability of future generations to meet their own needs.

To preach space tourism industry sustainability, Figure 2, Sustainable Intellectual Property Law & Space Tourism Exchange, and Figure 3, Guideline on Circular Turnover of Innovations & Space Tourism, carry a semantic load to enhance the orientation of technological development, institutional swap, and investment direction. In this context, intellectual property law protects the rights of those who develop innovative technology and invest in space tourism. Furthermore, the law of economics on offer and acceptance applied in the context of space tourism to satisfy human space needs. Intellectual property law provides a framework for innovative ideas and technology, paramount for promoting sustainable development in the space industry. Thus, applying intellectual property law to space tourism is a positive indicator of sustainable space development. The law of economics on offer and acceptance can be utilized to meet human space needs, while intellectual property law provides a framework for protecting innovative technology and investment. The idea is a correlation of the previous hypothesis, where human cosmological needs are equal to Maslow's and shall discourse the direction of international law concerning progress in outer space activities. It takes form through the economic circle [2]. At the same time, the effectiveness of the economic impact is exemplified by the subsequent notion of sustainable development/ Based on that, humanity can assemble sustainable development to ensure that the needs are met without compromising the ability of future generations to meet their own needs (UN, Report of the World commission on environment and development, 1987). The concept that sustainable development is a process of exchange in harmony, – enhance both current and future potential to meet human needs and aspirations [10] and demonstrated in Figure 2 and Figure 3.

2.2.1 Proposal on the Advancing (contacting) Parties of Intellectual Property Law (in the Space Tourism industry)

The concept of the circle in this paper represents a living mechanism where various elements interact to drive progress and development. These elements include Clients (C), Intellectual Property Law (IPL), Space Tourism (ST), the Intellectual Property Market of Space Tourism (IPM ST), and the Universal Body of Universe's Solution (UBUS):

(a) Clients – C – the designation given in the idea presented in Figure 1. C represents the individuals or groups seeking a particular service or experience related to space tourism.

(b) Intellectual Property Law – IPL–IPL of Earth Law and the Law of Universe. IPL refers to the legal framework that governs intellectual property rights on Earth and in space.

(c) Space tourism – ST – space activity with a specific purpose. ST is the specific purpose or activity related to space travel.

(d) The Intellectual property market of space tourism – IPM ST – is the concentrated integration point of intellectual property law, intellectual property, and needs. IPM ST represents the concentrated integration point of intellectual property law, intellectual property, and the needs of those involved in space tourism.

(e) Universal Body of Universe's Solution – UBUS – is an international legal protecting inter-independent organ (a mechanism). It operates on the principles of subject-matter jurisdiction and territorial specialization principles to set up a framework for resolving disputes related to space tourism and intellectual property rights.

Quantitative order	Party Elements	Status	Goods	Direct contact	Non-direct contact	Law of offer and acceptance	
						Offer	Acceptance
1	2	3	4	5	6	7	8
1	C	Congenital	Needs	ST, IPL	IPM ST	C	-
		Acquired	Law, Intellectual Property with Law vision			–	ST, IPL
2	ST	Congenital	–	C, IPM ST	IPL	ST	
		Acquired	Needs, Intellectual Property with Law vision			–	C, IPM ST
3	IPM ST	Congenital	Intellectual Property	ST, IPL	C	IPM ST	-
		Acquired	Law, Needs			–	ST, IPL

1	2	3	4	5	6	7	8
4	IPL	Congenital	Law	C, IPM ST	ST	IPL	-
		Acquired	Needs, Intellectual Property			–	C, IPM ST
5	UBUS	Congenital	Human rights observance, welfare, justice, prevention of violation	C, ST, IPM ST, IPL	–	UBUS	–
		Acquired	Law (through categorical apparatus of hypothesis #1), Needs, Intellectual Property			–	C, ST, IPM ST, IPL

Figure 3. Guideline on Circular Turnover of Innovations & Space Tourism
Source. Prepared on the basis of research data by authors
Bulgakova Daria & Bulgakova Valentyna

Figure 3. Guideline on Circular Turnover of Innovations & Space Tourism, drafts the quantitative order and various party elements involved in the exchange of goods and services in the context of space tourism, as well as the direct and non-direct contact methods used in the exchange. Comprehensively, content is the complex extended relationships and exchanges that occur in space tourism, including intellectual property, the application of international law, and the protection of fundamental human needs and relevant legitimate interests.

A description of the Figure 3:

• Quantitative order: The figure lists the various party elements involved in the order of their appearance in the exchange.

• Party elements: There are different parties involved, including Clients (C), Space Tourism (ST), Intellectual Property Market of Space Tourism (IPM ST), Intellectual Property Law (IPL), and the Universal Body of Universe's Solution (UBUS).

• Status: This outline answers whether the party element is congenital (inherent) or acquired (gained over time).

• Goods: This column indicates the goods or services exchanged between the parties.

• Direct contact: This stage is about whether the relations occurred through direct communication or interaction between the party elements.

• Non-direct contact: This category shows whether the interaction emerged without direct communication or interaction between the party elements.

• Law of offer and acceptance: This differentiation confirms whether the law of offer spreads and whether the party element accepts it.

The research emphasizes the importance of the various elements involved in the circle of space tourism, including clients, intellectual property law, space tourism activities, the intellectual property market, and international legal mechanisms such as UBUS. Consequently, Figure 2 illustrates the exchange interaction of the elements involved in the Contacting Parties. This exchange can be seen more detail by examining the informative data in Figure 3 representing the interaction process between discussed elements that drive progress and development in space tourism. Exchanges between these elements are crucial for this process to occur and result in progress and development.

Logical statements of the proposal:

1) The circle is a living mechanism. Elements are driving power.

2) The process is the interaction.

3) Cyclization is the motor of action.

4) Party elements exchanges are development/progress.

Hence, presented in the research article three figures contribute to understanding these relationships and their content implications for the future service package of ESE trips. By recognizing the role of features and facilitating exchanges between them, progress in law will drive commercial space flights achievable, causing essential satisfaction for space tourists.

2.2.2. Proposal on the Territory of Weightless

The inclination for exploration and challenging frontiers can have broad positive effects [11, 140]. One consequence of forging a path into unknown territory is that it is no longer a frontier and a door is potentially opened for others to follow [ibid.]. A process can begin of opportunity-seeking and economic expansion made possible in part by that first daring explorer [ibid.]. This process in need for recognition and can be defined as soon as there is clear understanding of the exploration territory or boundaries. Due to that point of view, the research expresses space and its infrastructure (such as launch sites and vehicles) as a unified territory governed by a uniform law and body acknowledging the challenges of navigating national and territorial legal frameworks. Concerning Figure 1, Figure 2, and Figure 3 in this research work, the authors categorize international law into two distinct categories: the Law of the Earth territory (Category #1) and the Law of a Weightless territory (Category #2).

Category #1 refers to all currently available laws that 1) do not pertain to weightlessness in Space and 2) view Outer Space as a weightless territory, forming successive differentiation. Category #2 encompasses the subject matter of the weightless territory of the dispute, which involves two intellectual property law scenarios. Thus, Category #2 pertains to intellectual property law related to weightless territory, which includes the following subjects:

A. Intellectual property law of terrestrial inventions functionally terminated in Space.

B. Intellectual property law of the weightless territory, which includes five statuses (stages):

1) Intellectual property created entirely in Space. It indicates intellectual property initiated, developed, continued, and completed in Space.

2) Intellectual property started on Earth but further took steps to be done in Space. It signifies that intellectual property was initiated on Earth but developed, continued, and completed in Space.

3) Intellectual property was initiated on Earth but developed and continued in Space, with further completion on Earth.

4) Intellectual property initiated on Earth developed and continued in Space but completed on Earth.

5) Intellectual property initiated and developed in Space but continued and completed on Earth.

CONCLUSIONS

1. International law interacts with space tourism through dialectical interaction of basic human needs via self-actualization, a satisfaction of human needs practically via intellectual property law, and satisfaction of human needs legally via law. Human needs such as self-actualization can be met by allowing individuals to engage in space tourism. Intellectual property law shall be applicable to protect the intellectual property of space tourism companies, ensuring that they can continue offering space tourism experiences to meet non-astronauts' basic needs. It is recommended to implement human rights, freedoms, and interests in the relevant presentation of international law on space tourism issues through recognition of basic needs of space tourist. This means that international law should incorporate needs in recognised rights, freedoms, and interests of humans who engage in space tourism.

2. The law of economics on offer and acceptance is a positive indicator to satisfy basic human needs during commercial space flights. It is achievable through circular of interacting processes that form a living mechanism consisting of driving elements. Consequently, intellectual property becomes legal, so intellectual property law applies. This means that the law of economics on offer and acceptance can be used to ensure that the goods and services, offered in space tourism, meet the basic needs of flights participants during a journey. Intellectual property law can also protect these goods and services and ensure they are legally available to those needing them through a) a circular of interacting processes that 'form'; b) a living mechanism that 'consists of'; c) driving elements, among which the intellectual property law is one of those elements, that 'have'; and where d) goods becoming offered and accepted, in 'consequence of that.' It is also based on the concept of sustainable development of the researched space activity to ensure that the essentials of humans who engage in space tourism are met sustainably. This can guarantee the long-term viability of commercial space activities. At the

same time, lawmakers should consider the legal implications through the weightlessness factor involving the development of regulations that apply specifically in a weightless environment.

3. Finally, this study highlights a new theoretical approach to international and intellectual property laws. It thereby updates it according to economic tech innovations, such as the space tourism industry. The research proposes a new approach that weighs the essentials of non-astronauts engaged with commercial space flights. Future research could explore the implications of findings in the presented article for other areas of law or industries that rely on them. Studies could use the same experimental setup to explore further the interaction of international law, intellectual property, and the needs of potential space participants. Therefore, more research on the presented topic is recommended, and studies using the same experimental setup are apparent.

REFERENCES

[1] Bulgakova, D. (2023). The Space Right to Food & Guarantees. *Advanced Space Law*, 11, 4–18. Retrieved from https://doi.org/10.29202/asl/11/1

[2] Bormotov (2009). *Economic cycles: historical evidence, classification, and explication.* Canadian Economics Association, Munich Personal Archive.

[3] Brehm, A. R. (2015). Private property in outer space: Establishing a foundation for future exploration. *Wisconsin International Law Journal,* 33(2), 353–379.

[4] Erlank, W. (2015). Finding property in new places – property in cyber and outer space. *Potchefstroom Electronic Law Journal,* 18(5), 1761–1795.

[5] Goldsmith, D., & Rees, M. (2022). Mars: do we still need astronauts? Nature (London), 606(7914), 463–463. Retrieved from https://doi.org/10.1038/d41586-022-01623-0

[6] Halunko, V., Ivanishchuk, A., Hlobenko, I., Oksiutenko, K., & Saviuk, M. (2021). Mission to Mars: Medical and Legal Aspects of the Protection of Human Rights to Life and Health during Long-Lasting Space Missions. *Advanced Space Law (Online)*, *8*, 27–39. Retrieved from https://doi.org/10.29202/asl/8/3

[7] Hobe, S. & Cloppenburg, J. (2005). Towards a New Aerospace Convention? Selected Legal Issues of 'Space Tourism.' *Proceedings of the Forty-Seventh Colloquium on Law of Outer Space,* 8*,* 377.

[8] Leden & Shears, (1996). *Package Holidays, Law and Practice – Part 1. Consumer Law, ch.10*. London, 4th ed. Schuster. Pitman.

[9] Lee, R. J. & Steele, S. L. (2014). Models for codifying international rules for commercial passenger spaceflight jurisdiction, liability, safety, and accident investigation. *Nordic Journal of International Law,* 83(3), 251–292.

[10] López, D., Johnson, L., Samson, V., Simpson, M. & Weeden, B. (2014). The importance of the united nation's guidelines for the long-term sustainability of space activities and other international initiatives to promote space sustainability. *Oasis – Observatory of Analysis of International Systems,* 20, 37–53.

[11] McElroy, M. W. (2023). *The space industry of the future: capitalism and sustainability in outer space*. Routledge.

[12] Maslow, A. H. (1943). A theory of human motivation. *Psychological Review,* 50(4), 370–39. doi: 10.1037/h0054346.

[13] Sattler, R. (2003). U. S. Commercial activities aboard the International Space Station. *Air & Space Law*, 28, 81.
[14] White Frank is describing the Overview Effect. *'Overview from Planetary Collective*.' Available online: http://www.realclearscience.com/blog/2013/02/the-overview-effect.html (at 7min 25sec of video).
[15] Widgerow, D. (2010). Boldly going where no realtor has gone before: The law of outer space and a proposal for a new interplanetary property law system. *Wisconsin International Law Journal,* 28(3), 490–520.

Дар'я Анатоліївна Булгакова
Доктор Права, Доктор Філософії з Міжнародного Права
Факультет Права
Університет Міжнародної Економіки та Торгівлі
100029, вул. Хуейсінь Донджіє, 10, Район Чаоян, Пекін, Китай

Daria A. Bulgakova
Doctor of Laws, PhD in International Law
Law Faculty
University of International Business and Economics (UIBE)
100029, 10 Huixin Dongjie Str, Chaoyang District, Beijing, China

Валентина Анатоліївна Булгакова
Педагог-методист вищої категорії
Науковий керівник дослідницьких робіт
з філософії, соціології та права в Дніпропетровській області
Криворізька гімназія №91 Криворізької міської ради Дніпропетровської області
50008, вул. Генерала Радієвського, 48, Кривий Ріг, Україна

Valentyna A. Bulgakova
Pedagogue-Methodist of the Highest Category
Supervisor of scientific manuscripts
On history, sociology, and law in Dnipropetrovsk Oblast'
Gymnasium №91 of Kryvyi Rih City Council of Dnipropetrovsk Oblast'
50008, 48 General RADIEVSKY Str. Kryvyi Rih, Ukraine

Рекомендоване цитування: Булгакова Д. А., Булгакова В. А. Визнання базових потреб неастронавтів під час комерційних космічних польотів. *Вісник Національної академії правових наук України.* 2023. Т. 30. №4. С. 75–97.

Suggested Citation: Bulgakova, D. A., & Bulgakova, V. A. (2023). The Recognition of Basic Non-Astronauts Needs During Commercial Space Flights. *Journal of the National Academy of Legal Sciences of Ukraine,* 30 (4), 75–97.

Стаття надійшла / Submitted: 16/10/2023
Доопрацьовано / Revised: 16/11/2023
Схвалено до друку / Accepted: 22/12/2023