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Exploring the Final Frontier: The Significance of Space Diplomacy in a Rapidly Evolving Cosmos

**Odkrywanie finalnej granicy: znaczenie dyplomacji kosmicznej
w szybko ewoluującym kosmosie**

Abstract

Space exploration has become a collaborative endeavour, transcending national boundaries and necessitating the establishment of space diplomacy. This article delves into the significance of space diplomacy in a rapidly evolving cosmos, and explores its definition, historical context, and the role of international treaties. As the cosmos continues to rapidly evolve, space diplomacy becomes ever more vital for managing conflicts, promoting sustainable space activities, and fostering cooperation among spacefaring nations.

The article explores the main stages of international cooperation in the space domain, defines the concept of “space diplomacy” and its peculiarities, and outlines key partnerships, challenges, and opportunities for future cooperation in space exploration. The article analyses the impact of Russia’s war against Ukraine on international relations in the space domain and attempts to predict future space alliances influenced by terrestrial policies.

Key words: *outer space, diplomacy, space diplomacy, international cooperation, ISS, Ukraine.*

Abstrakt

Eksploracja kosmosu opiera się na współpracy międzynarodowej, w związku z czym wymaga wprowadzenia dyplomacji kosmicznej, która jest niezwykle ważna w procesie zarządzania konfliktami, promowania zrównoważonych działań kosmicznych i budowania relacji między partnerskimi państwami.

Artykuł podejmuje zagadnienie znaczenia tejże dyplomacji w związku z szybko rozwijającymi się badaniami kosmosu. Autorzy definiują pojęcie dyplomacja kosmiczna, zwracają uwagę na jej specyfikę, omawiają kluczowe partnerstwa (również te potencjalne) w zakresie eksploracji kosmosu, a także najważniejsze wyzwania i możliwości rozwoju w tej dziedzinie. Analizują ponadto wpływ wojny Rosji z Ukrainą na stosunki międzynarodowe w kontekście przestrzeni kosmicznej, odnoszą się również do potencjalnych sojuszy kosmicznych.

Słowa kluczowe: *przestrzeń kosmiczna, dyplomacja, dyplomacja kosmiczna, współpraca międzynarodowa, ISS, Ukraina.*

Diplomacy is no longer limited to earthly issues. Space today provides an opportunity for states to pursue their economic interests, engage in military activities, and serves as a tool to achieve political goals on the international stage. Undoubtedly, international cooperation in space exploration requires special organizational and legal frameworks and mechanisms, including political ones. Space diplomacy plays a significant role in safeguarding national interests while providing additional means to address the global challenges associated with the exploration and utilization of space.

Indeed, the main contemporary space issues requiring consolidated efforts of global actors include the militarization of space, security, ecology, proper regulation of activities, sustainable development, and more. As the challenges stemming from space activities have a global impact, space diplomacy serves as an effective tool for both preventing catastrophic consequences and managing existing crises.

International relations in the field of space exploration and research are directly linked to geopolitical realities on Earth. Joint international space projects can only be realized by powers that are allies on Earth as well. Politics have always been at the center of space research and development, and space programs have never been divorced from Earth's international politics. (Sheehan, 2007, p. 1-2) However, space projects have their own

specificities, such as technological complexity, high costs, and specific implementation conditions, which prevent abrupt termination of partnerships. For instance, following Russia's full-scale invasion of Ukraine on February 24, 2022, the United States imposed unprecedented sanctions against Russia, but they are still compelled to remain partners in the joint operation of the International Space Station (*ISS*). On the other hand, since the early days of human space exploration, some states have sought to turn space into an arena of political competition, advancing their national interests. From this perspective, space becomes one of the factors influencing world politics. Researchers such as James Clay Moltz, Mai'a K. Davis Cross, Saadia M. Pekkanen, Bledwyn E. Bowen and others have shown a scientific interest in exploring the space component of international relations and world politics.

It is essential to comprehensively study the issue of space diplomacy, including its theoretical aspects and existing global practices, to gain a deeper understanding of intergovernmental interaction in space exploration. Therefore, the aim of this article is to operationalize the concept of "space diplomacy" through a historical retrospective analysis of international cooperation in space exploration and an investigation of key issues related to space exploration in the modern era.

Space diplomacy is an integral part of classic diplomacy and is one of the important means of implementing the tasks and goals of a state's foreign policy. It developed along with the development of space activities, taking into account geopolitical factors. At the same time, space diplomacy has specific characteristics due to certain key factors, such as the physical peculiarities of space, the scale of space projects requiring significant financial and intellectual resources, the absence of national borders in space, etc. In this case, diplomacy is perceived not only as an instrument of conducting the foreign policy of a state but also as a means of regulating international relations in the space sphere.

Space activities are conducted under specific conditions, which in turn affect the possibilities of international interaction. Let us consider the peculiarities of space as a domain of activity.

Outer space is the area beyond the Earth's atmosphere. There is no clear boundary between the Earth's atmosphere and space. The Karman Line, 100 km above sea level, is considered the conventional altitude where space begins. This decision was made by the International Aeronautical Federation in 1960 in order to somehow fix world records. However, this norm is advisory and not enshrined in international law, and therefore is not mandatory in countries engaged in space activities. At the same time, international law recognizes

the following feature of outer space: according to the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, space “shall be free for exploration and use by all States” and shall not be subject to national appropriation by means of proclamation of sovereignty (Treaty, 1967). Therefore, states can conduct reconnaissance and other activities in space unhindered, which is not possible in the atmosphere above the territories of other states. (Arbatov, 2010, p. 20) In 2019, NATO recognized space as an operational domain of military activity, alongside air, land, sea, and cyberspace. From this point of view, Earth’s orbit is simply an extension of the “terrestrial” environment beyond the atmosphere, something that more resembles a coastline or a new flank rather than a “new ocean”. (Bowen, 2022, p. 241)

In order to give meaning to the term “space diplomacy” and define its components, it is advisable to carry out a historical retrospective analysis of international interaction in the field of space exploration and identify the main stages of the development of space diplomacy.

Traditionally, the era of practical space exploration, which began on October 4, 1957 with the launch of the first artificial Earth satellite, is divided into two stages: the bipolar (1957-1991) and the multipolar (1991 – present). (Hays, 2007) Bohumil Doboš identifies three periods in the history of space exploration: clear bipolar competition (1950-1970s), the emergence of new actors in bipolar competition (1970-1980s), and multipolarity (1990s – present). (Doboš, 2019, p. 40) For our research, we have taken the proposed periodizations as a basis and expanded them with events of recent years, which will undoubtedly have a significant impact on the future landscape of international cooperation in the field of space exploration. Each of these periods has its own specificity, which directly influenced the nature of space diplomacy.

The first stage of development of international relations in space exploration can be considered the beginning of the 1960s to the mid-1970s, a period of formation of the normative and legal framework for the exploration and use of outer space.

Immediately after the launch of the First Artificial Earth Satellite in 1957, the issue of legal regulation of activities in outer space arose. The diplomatic dialogue of this period was characterized by a search for answers to key questions related to the use of outer space: the status of outer space (including the unresolved issue of its delimitation), the identification of actors in space activities, and the establishment of rules of interaction and limitations in outer space. (Bello, 2019) In order to initiate diplomatic dialogue after the aforementioned satellite launch, a special forum was created – the United

Nations Committee on the Peaceful Uses of Outer Space (COPUOS), established in 1959 by 18 states. It is worth noting that the multilateral platform of COPUOS essentially served as a bilateral axis between the United States and the Soviet Union – the only spacefaring nations at that time. (Bello, 2019)

The main functions of COPUOS were the examination of the activities of the UN, its specialized agencies, and other international organizations in the field of the peaceful uses of outer space; the implementation of international cooperation under the overall guidance of the UN; and the resolution of legal issues arising from the implementation of space utilization programs. The committee consisted of two subcommittees – the Legal Subcommittee and the Scientific and Technical Subcommittee.

The issue of regulating outer space gained support at the highest level. For example, in a speech at the United Nations General Assembly on September 25, 1961, US President John F. Kennedy stated that “the new horizons of space must not be conditioned by the old antagonisms of imperialism and sovereign claims”. (Address, 1961) Over the next five years, several rounds of international negotiations took place within COPUOS, primarily involving the United States and the Soviet Union. The result of these meetings was the opening for signature on January 27, 1967, 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”. (Treaty, 1967) As of May 2023, 111 states are parties to this treaty; and an additional 23 countries have signed the treaty but have not yet ratified it. In the years following the adoption of the Outer Space Treaty, only four implementation agreements and a series of nonbinding principles and multilateral agreements have been added.

During this period, the Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space (1968), the Convention on International Liability for Damage Caused by Space Objects (1972), and the Convention on Registration of Objects Launched into Outer Space (1976) also entered into force.

The first half of the 1970s in international relations was characterized by a relaxation of tensions of the Cold War, which also influenced joint projects for the exploration of near-earth space. The most significant project was the joint flight of the spacecraft *Soyuz19* and *Apollo* in 1975.

The second half of the 1970s and the 1980s were characterized by the continuation of the space race as part of the Cold War, which was reflected by the competition between the reusable spacecraft the *Space Shuttle* and the *Energia-Buran*, as well as the construction of orbital stations.

The structural reforms in the USSR that began in 1985 and the subsequent dissolution of the Soviet Union in 1991 led to changes in global space policy: the superpower rivalry came to an end, and the economic problems in Russia (as the successor of the USSR) prevented it from continuing space exploration at its previous scale. In the United States, there was active discussion about the economic efficiency of NASA and the need to commercialize space activities. The desire to reduce for the cost of space exploration stimulated the development of international cooperation, not only between governments but also with the private sector.

An example of scientific cooperation in space exploration is the study of Halley's Comet during its approach to the Sun in 1986. Five years before this event, an Interagency Advisory Group was established, consisting of space agencies from the United States, Europe, the Soviet Union, and Japan. The group's goal was to coordinate, in an informal manner, the issues related to projects and activities planned within the framework of observational missions. In 1986, five spacecraft from these countries approached Halley's Comet. Information exchange within this group contributed to a deeper understanding of the comet.

At the end of the Cold War, when the Soviet economy and political system collapsed, leading to the disintegration of the USSR, concerns arose that the Soviet Union's expertise in rocketry and military technology would seep into the hands of the most eager aspirants, providing authoritarian governments access to advanced weaponry, including ballistic missiles. This prompted Western governments to encourage US space contractors to penetrate the supply chains of post-Soviet countries. (Fernholz, 2020, p. 170) For example, the American company *Lockheed Martin* established a joint venture with the Russian state rocket company for launching commercial satellites using *Soyuz* rockets, and *Arianespace*, a leading European space company, acquired *Soyuz* rockets for its own launches. *Lockheed Martin* also utilized Russian-made *RD180* engines in its *Atlas V* rockets.

Another international consortium, *Sea Launch*, was created in 1995, which included the American aerospace corporation *Boeing*, the Russian rocket and space corporation *Energia* (25%), Ukrainian design firm *Pivdenne*, Ukrainian manufacturing facility *Pivdenmash*, as well as the Norwegian shipbuilding company *Aker Kvaerner*. *Sea Launch* was a floating spaceport built for launching Ukrainian *Zenit-3SL* rockets. The idea of a maritime spaceport was conceived to transport launch vehicles by sea to the equator, where launch conditions are optimal due to the Earth's rotational inertia. (Stuart, 2014, p. 148) The first launch from the floating spaceport took place

in 1999, and the last, the 36th launch, occurred in 2014. After the completion of this project, the Russian company *S7* acquired it following lengthy negotiations, and in 2020, they announced its indefinite suspension.

The term “space diplomacy” began to be widely used during the construction of the long-term space project, the International Space Station (*ISS*). In 1984, US President Ronald Reagan stated in his annual address to Congress that NASA was developing a project for a space station that would be put into operation within ten years. (Oberhaus, 2020)

The project required enormous funding, even by US standards, and as such was restructured multiple times and its budget was reduced. In 1993, the project was on the verge of being shut down, and Congress voted on a proposal to end it. The proposal fell short by only one vote.

In this situation, there was only one possibility left to continue the project: to involve international partners in the space station’s construction. In 1998, a robotic arm of Canadian origin connected the American *Unity* module with the Russian *Zarya* module, marking the beginning of the construction of the first ever international space station. A total of 15 countries participated in the creation of the International Space Station (*ISS*): Belgium, Brazil, Denmark, Spain, Italy, Canada, the Netherlands, Germany, Norway, Russia, the United States, France, Switzerland, Sweden, and Japan. The operation of the *ISS* began on November 2, 2000.

It is worth noting that this engineering and scientific achievement was preceded by decades of international negotiations, meetings at various levels, and unprecedented cooperation, which ensured the successful planning, construction, and operation of the *ISS*.

The main motivation for countries to participate in this project was scientific and technical cooperation, exchange of expertise, and the opportunity to remain competitive in the rapidly advancing technological landscape. However, a global project of such magnitude could not avoid political and ideological conflicts. Russia’s participation in the project was ambiguously perceived by American society. Although scientific achievements and economic benefits were cited as the main arguments for involving Russia in the construction of the *ISS*, many believe that it was primarily driven by geopolitical factors. In particular, American researcher Tara Miller notes that “since Russia joined the *ISS* project, it has become an instrument of foreign policy. The station is used to prevent the transfer of advanced engine technologies from Russia to other countries.” She expressed hope that “the Russian space program can be used constructively to ensure that rocket technologies do not fall into the hands of hostile states.” (Miller, 2004)

Despite all the complexities and divergences, the *ISS* remains one of the most successful examples of space diplomacy. Due to circumstances, even during times of heightened international tensions, the *ISS* becomes a tool for reaching compromises. (Payette, 2012) At the same time, for Russia, the *ISS* serves as another means of blackmail and a platform for propaganda and provocations.

After the end of the Cold War, the United States lost interest in space leadership, mistakenly assuming that this domain could become a global platform solely for peaceful scientific research. (Smithsonian, 2023) The United States displayed optimism and concluded that if they decided not to utilize space capabilities, others would follow suit. Such shortsighted policy, according to American General Herbert McMaster, led to the United States falling behind in the field of space. (McMaster, 2020, p. 344) After the completion of the *Space Shuttle* program in 2011, the United States became dependent on Russia for manned space flights. International cooperation indeed expanded, but so did competition. It became evident that space technologies provide the United States with both economic and strategic advantages, including on the battlefield. Russia and China began not only to develop their own space programs but also to create weapons that could potentially interfere with the operations of American satellites. In 2020, the private American company *SpaceX* started to operate the *Crew Dragon* spacecraft and restored independent access for US astronauts to space.

The 21st century has drawn new horizons in the development of the space industry, while presenting new challenges and threats to space diplomacy. It has become evident that the norms of international law established 50 years ago for regulating space activities are lagging behind the actual achievements of space exploration. The number of actors engaged in space activities is rapidly increasing, with dozens of countries and private companies possessing space technologies today. In the 1960s, there were only a few spacecraft in space, but as of August 2021, there are over three thousand operating satellites orbiting the Earth, with more than half of them belonging to the US government or American companies, while 84 countries operate other space assets. Space tourism is also a rapidly developing business direction. In July 2021, two companies, *Blue Origin* owned by Jeff Bezos and *Virgin Galactic* owned by Richard Branson, successfully conducted test flights of suborbital tourist spacecraft. According to *Morgan Stanley*, an investment bank, the space tourism market is projected to reach three billion dollars by 2030. Space exploration has always been a part of countries' military power, but in recent years, its militarization has significantly intensified. Starting

in 2019, countries such as the United States, France, Japan, and Germany have established space forces or units.

Certain space systems have become part of critical infrastructure on which the functioning of the global economy and the wellbeing of society depend. Space technologies also contribute to national security and enhance a country's military capabilities. The issue of space ecology, particularly eliminating space debris, is of acute concern today.

To effectively address the challenges of the 21st century, an expert working group operated within the framework of *COPUOS* (Committee on the Peaceful Uses of Outer Space) from 2010 to 2018, achieving some progress. International experts developed 21 recommendations on the "long-term sustainability of space activities." Although these principles are not binding for participants, they may serve as a basis for responsible behavior norms in the field of space exploration in the future. These guiding principles focus on the "political, regulatory, operational, safety, scientific and technical, international cooperation, and capacity-building aspects of space activities." (*The COPUOS...*) As decisions in *COPUOS* are based on consensus, meaning that each of the 95 member states has the right to veto, reaching agreement on these recommendations was a significant diplomatic success.

It is important to note that the 21 guiding principles only apply to activities within Earth's orbit. However, the operations of space agencies and private companies are not limited to this space. Space stations are being developed on the Moon, Mars, asteroids, and other planets. It is crucial to establish responsible behavior in the distant cosmos as well. Particularly contentious is the issue of regulations governing the mining and utilization of extraterrestrial resources.

To expedite the process of developing guiding principles for activities on the lunar surface and in the vicinity of the Moon, the United States, through NASA, initiated negotiations with countries planning to participate in the *Artemis* program, which aims to return humans to the Moon in this decade. In May 2020, NASA published a document called "*Artemis Accords Principles for Cooperation in Civilian Exploration and Use of the Moon, Mars, Comets, and Asteroids for Peaceful Purposes.*" (Hitchens, 2018)

The *Artemis Accords* are a set of principles and processes through which NASA and space agencies from other countries can agree on a common set of principles regarding lunar exploration and the use of the moon's resources. On October 14, 2020, eight heads of space agencies and corresponding departments from the United States, Australia, Canada, Italy, the United Kingdom, Luxembourg, Japan, and the United Arab Emirates signed these accords. Officials

from the Federative Republic of Brazil also expressed their readiness to participate. A month later, Ukraine joined these countries, becoming the ninth country to embrace the principles of the United States in space exploration.

The *Artemis Accords* establish the principles of lunar landing, permanent residency of crews, and resource mining on the Moon, as well as provide the legal framework for a new era of space exploration, including human missions to Mars in the 2030s.

The first attempt to regulate human activities on the lunar surface was the *Moon Treaty* of 1979. However, it only had seven ratifications, and none of the major spacefaring nations ratified it. Experts believe that the countries actively involved in space exploration did not sign the treaty because they did not want to limit themselves to purely scientific research on the Moon. (Kaul, 2020, p. 89)

Business interests became particularly prominent in the 21st century when celestial objects were seen as a source of energy and rare-earth resources. In 2015, the U.S. Congress passed a law allowing American companies and citizens to use resources from the Moon and asteroids for commercial purposes. Additionally, President Trump issued an executive order titled “Encouraging International Support for the Recovery and Use of Space Resources,” stating that outer space is no longer the common heritage of mankind (as proclaimed in the *Moon Treaty*) and that private property rights will apply to it.

The goal of such a policy is to create a legal framework for companies that possess extraterrestrial resources. (Shounak, 2015) The first countries to adopt legislative norms for licensing space resources were Liechtenstein and Luxembourg.

Both Trump’s directive on space resource mining and the *Artemis Accords* have raised concerns among many countries. Countries with space ambitions and capabilities, including India, South Korea, Israel, China, Russia, and others, have not yet joined these agreements.

Another factor altering the landscape of international space cooperation is Russia’s aggression against Ukraine. The war has affected the entire space industry, and its consequences will be analysed for many years. However, it can already be said that Russia has suffered the greatest detrimental impact from this war.

In the early days of the full-scale hostilities, *Roscosmos* announced the suspension of *Soyuz* rocket launches from the Kourou spaceport in French Guiana, thus putting an end to a highly successful project that had been ongoing since 2011 and had survived all previous sanctions. *Roscosmos* also lost economically advantageous contracts for launching *One Web* satellites. In March

2022, the European Space Agency (ESA) declared a halt to any cooperation with *Roscosmos*. As a result, the *ExoMars* mission, which was scheduled to depart for Mars in the fall of 2022, was deprived of a launch vehicle, a landing platform, some instruments, and radioisotope heaters. According to optimistic forecasts, the launch of *ExoMars* may not occur before 2028. (Burbach, 2022)

Other space agencies and companies from Western countries have also discontinued space cooperation with Russia. Even Kazakhstan has seized *Roscosmos*' property at the Baikonur Cosmodrome. While formally this step is motivated by economic reasons due to debts, the political undertone is quite evident. In the end, the only area where Russia still collaborates with Western countries is the International Space Station (*ISS*).

Sanctions against Russia have created the threat of a severe shortage of launch vehicles on the launch market. The situation is further exacerbated by the fact that two launch vehicles, the *Atlas V* and *Ariane 5*, are being phased out, and their successors are not yet ready for flight.

However, the vacuum created by Russia was quickly filled by *SpaceX*. 2022 was a year of triumph for the company owned by Elon Musk. During that year, *SpaceX* conducted 61 space launches. Only China performed more launches in 2022.

India has also been able to take advantage of the situation. In recent years, India has made active efforts to establish itself as a country with inexpensive and reliable means of delivering payloads to orbit, capable of competing with traditional launch operators. India has demonstrated its capabilities by successfully launching several batches of *OneWeb* satellites.

Of course, not everything is so optimistic. Firstly, the shortage of launch vehicles has not been completely overcome. Secondly, the war has disrupted several logistical chains, which has raised questions about the possibility of further operation of certain rockets. For example, the *Antares* rocket, whose first stage was manufactured by the Ukrainian company *Pivdenmash* and featured Russian RD181 engines, suffered component losses. In the new modification of this rocket, which the company plans to develop jointly with *Firefly Aerospace*, the first stage will be equipped exclusively with American components.

Another important trend influenced by the Ukrainian-Russian war is the strengthening of public-private partnerships. NASA has been actively collaborating with private companies, gradually shifting some of its traditional functions to them. However, there is now a focus on military cooperation.

The invasion of Ukraine vividly demonstrated the advantages provided by satellite systems in modern warfare. Take, for example, the low-Earth orbit satellite internet system. Until February 2022, many experts still do-

ubted its potential demand. Now, all leading countries want to have access to *Starlink* or a similar system.

The war has also led to a sharp increase in demand for satellite imagery of the Earth's surface. Western military satellites have the resources for conducting reconnaissance, but due to the wide geography of the conflict, their quantity is simply insufficient for constant monitoring of all areas of interest, both on the battlefield and in the Russian rear. This deficit has been partially filled by companies like *Maxar*, *Planet Labs*, and *BlackSky*, which are engaged in commercial Earth imaging.

Similar growth is observed in adjacent satellite services, such as projects designed for tracking radiofrequency signals. Another rapidly developing direction is radar imaging of the Earth's surface.

In conclusion, it can be inferred that the war has effectively removed all previously existing barriers to space cooperation between the private sector and the state.

The rapid pace of space exploration, increased interest in space commercialization, and the unregulated nature of such activities increase the potential for conflicts beyond our planet. These events have renewed interest in the role that space diplomacy can play in ensuring security for all actors. Space-related matters, which once fell under the scope of national security interests, now extend to a wide range of geopolitical and geo-economic issues.

Given the above, it is clear that space diplomacy is becoming increasingly important in addressing issues in the space sector, working towards the realization of both traditional and innovative tasks driven by the dynamics of the space industry. The consolidated efforts of relevant intergovernmental institutions and organizations, space companies, and other stakeholders to delineate their interests and possible points of intersection will enable the resolution of all problematic issues on Earth and minimize the risk of conflicts in space.

One of the most important trends in the coming years will be the strengthening of public-private cooperation. Private companies offer cheaper, faster, and high-quality alternatives to government projects. Therefore, the number of government orders for the creation of satellite constellations and spacecraft is expected to increase.

The number of space actors will also continue to grow. Any country aspiring to be a significant geopolitical player must be capable of independently meeting its basic needs. Therefore, countries like Brazil, Turkey, South Africa, and Indonesia may join the space club.

There will also be a strengthening of the US-China confrontation leading to the final formation of space alliances. Regarding space alliances, their com-

position can be predicted as follows. On one side, the US, the European Union, Japan, Australia, and South Korea. On the other side, China and its partners in developing countries (Iran, Pakistan, and some Asian and African states). As for Russia, its influence in the space arena will continue to decline rapidly.

The position of India raises a separate question. It may join the Western bloc or attempt to pursue a policy of nonalignment and position itself as a unique third force ready to cooperate with everyone.

In any case, the architecture of future space alliances will be much more complex than during the Cold War. Only time will reveal whether the confrontation of these alliances will be as extensive and tense as before.

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